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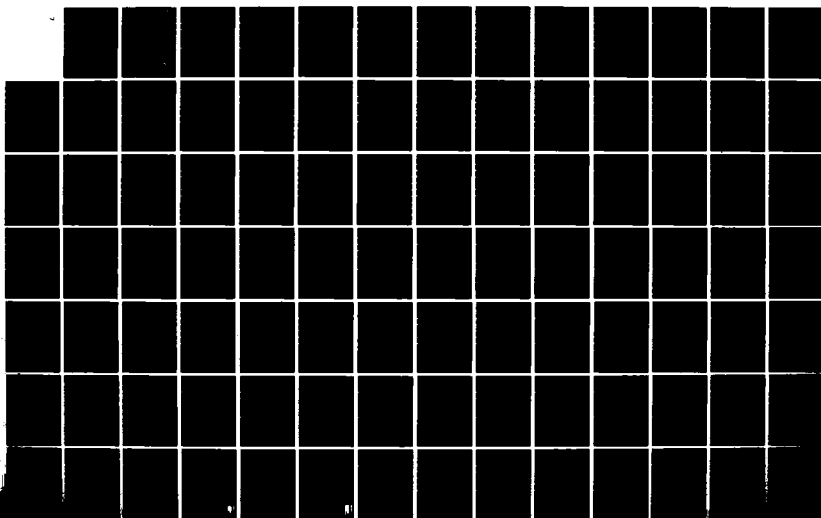
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E... (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

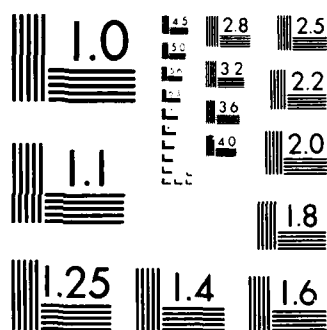
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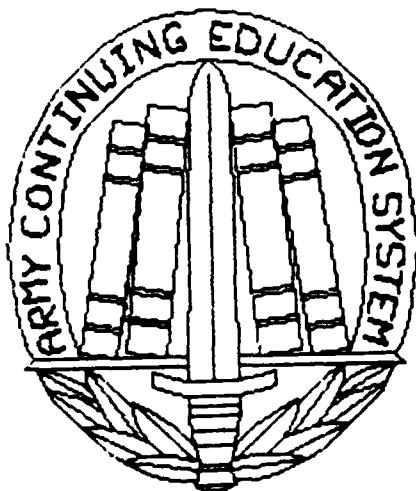
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NEEDS ASSESSMENT
TO DEFINE THE TRAINING REQUIREMENTS FOR A
BASIC SKILLS EDUCATION PROGRAM (BSEP)
CURRICULUM DEVELOPMENT

OPERATIONAL SUMMARY REPORT

Submitted By
RCA Service Company
Cherry Hill, NJ
Reference Contract
DABT 60-81-C-0017



APRIL 1984

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OPERATIONAL SUMMARY REPORT
Contract DABT60-81-C-0017 (CDRL A004)

Prepared By:

RCA Service Company

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Revised April 1984

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Requirement of Report	1
Format of Report	1
Descriptive Statistical Summary	1 - 2
Extended Task Analysis Procedures (ETAP)	2 - 4
Taxonomy	4 - 5
Data Processing and Subtasks	6 - 7
MOS Summaries	7
Taxonomy Summaries	7
 <u>Attachments</u>	
Attachment A - MOS and Location Listing	A-1 - A-3
Attachment B - Analysis Per Location and Date	B-1
Attachment C - Analysis Results Summary	C-1
Attachment D - Cumulative Number of Tasks Analyzed/MOS/Month	D-1 - D-8
Attachment E - Final Status Report	E-1 - E-4
Attachment F - Data Recording Forms	F-1 - F-12
Attachment G - Examples of ETAP Results	G-1 - G-33
Attachment H - ETAP Report Description	H-1 - H-4
Attachment I - Guidance for Processing Analysis Review Comments	I-1 - I-2
Attachment J - Taxonomy Developed for Use with Analysis	J-1 - J-13
Attachment K - Analysis Related Reports Produced Via Data Processing	K-1 K-10
Attachment L - Complete Subtask Index	L-1 - L-12
Attachment M - Complete List of Subtasks Developed and Used	M-1
Attachment N - MOS Summaries	N-1 - N-148
Attachment O - Taxonomy Summaries	O-1 - O-316

Requirement of Report

The requirement for development of this operational summary is stated in CDRL Sequence Number A004, Attachment 1 to Modification P00006 of Contract DABT60-81-C-0017. For the purposes of orientation this requirement is restated below:

"(1) Operational Summary. Information in this part shall be presented for the analysis effort in the aggregate and for location and/or MOS grouping. Included will be: discussion of usability of ETAP and operational elaborations; discussion of interview, write-up, and substantiation procedures; discussion of verification and instructional review processes; discussion of taxonomy development and use, plus inclusion of the complete taxonomy in use at the completion of the analysis effort; discussion of full analysis elaboration; listing of pertinent operational details, such as dates, time factors per task, and an average analysis time for each MOS, and SME/instructional utilization; and inclusion of subtask index."

Format of Report

In addition to the ^{this} Requirements section included above, the report contains the following sections: Descriptive Statistical Summary, Extended Task Analysis Procedures (ETAP), Taxonomy, Data Processing, Subtasks, MOS Summaries, and Taxonomy Summaries.

Descriptive Statistical Summary

Work on the task analysis effort covered the timeframe of 8 June 1981 to 31 December 1982. Summary descriptive statistics are available to demonstrate magnitude of effort and rate of progress. The summary statistics are presented as follows:

1. Attachment A provides information on the MOS included in the effort, plus analysis and instructional review locations. Ninety-four (94) MOS were included. For the purposes of this report common tasks are handled as a "separate MOS." In most instances analysis and instructional review was performed at the same location. In instances where AIT was conducted at a location other than the proponent school (where analysis was conducted), instructional review was performed at the location of AIT. Common tasks were analyzed at the proponent school. Two (2) replicate analyses were performed for each common task in accordance with the following guideline: Each common task was analyzed (original or replicate) at a combat arms, combat support, and combat service support location.
2. One way to gain a prospective on the magnitude of effort is to look at the buildup of analysts across locations as the effort continued. Such information is presented at Attachment B. Locations in operation ranged from five (5) in June 1981, to eighteen (18) in July 1982, to two (2) in November 1982. Correspondingly the total number of analysts ranged from eleven (11) in June 1981, to thirty-three (33) in June 1982, to three (3) in December 1982.

3. For the analysis effort rate of progress was often viewed on an MOS-by-MOS basis as expressed by arithmetic average (mean) per task. A more composite look at rate of progress can be shown by viewing progress on a location-by-location basis in terms of range, median, and mean. Such data are shown at Attachment C. The data were computed as follows for all locations having two (2) or more MOS:

- a. Range = Highest average time per task (MOS-by-MOS basis) minus lowest average time per task (MOS-by-MOS basis).
- b. Median = 50% percentile from a high to low rank ordering of average time per task (MOS-by-MOS basis).
- c. Mean - Arithmetic average of average time per task (MOS-by-MOS basis).

Factors included in the average time per task were: original analysis, write-up (substantiation), verification, instructional review, and analysis planning.

4. A more detailed look at rate of progress can be gained by looking at tasks completed monthly on an MOS-by-MOS basis at the various locations. Such data are shown at Attachment D. The cumulative tasks submitted for input; following analysis, write-up (substantiation), verification and instructional review, is shown on a monthly basis. In most instances the work of a single analyst is reflected in the progress.
5. Throughout the analysis effort progress was shown monthly in the Letter Progress Reports. As a summary indicator of magnitude and rate of progress, the final report has been provided at Attachment E.

Extended Task Analysis Procedures (ETAP)

The Extended Task Analysis Procedures (ETAP) were provided as Government Furnished Materials (GFM) to serve as a guideline for the task analysis effort. Initially, and throughout the analysis period, various issues arose concerning use of the ETAP. The major issues and a discussion of each is presented below.

1. The ETAP was (is) presented as a methodology for use with any task requiring analysis. It does not provide guidance as to how to plan for or schedule a large scale analysis effort at a particular location or across several locations. To supplement the ETAP, the following factors were considered in an evolving approach to analysis planning.
- a. Since the ETAP proceeds through a series of interviews required for original analysis, verification, and instructional review, an important aspect of analysis planning is to explain these processes and develop a workable schedule so resource requirements can be met.

- b. Work location is also an important consideration in analysis planning. A work location which was close to required GFM (Technical Manuals, Field Manuals, Supply Bulletins, Regulations, Directives, etc.) and to training areas was preferred to separate interview facilities.
 - c. Verification that the most recent GFM (Soldier's Manual or Task List) was available as a source of tasks.
 - d. Review and sequencing of tasks for analysis. Analysis can proceed most efficiently when tasks are sequenced. Factors important to sequencing include: content similarity, complexity, special resource requirements, sharing with other MOS, and likelihood for subtask and cross-reference utilization. (Subtasks and cross-referencing are discussed below in separate sections on Data Processing and Subtasks.)
2. The ETAP originally described the extent of the analysis required in terms of "the lowest ability soldier." This description appeared unworkable and was replaced with three (3) descriptions for "entry-level soldier." These descriptions proved more workable, but still did not provide full guidance concerning extent of analysis. Concurrent with the above was a continuing discussion concerning expression of analysis results in terms of procedures (Steps 3 and 4 of the ETAP) or knowledges (Step 10 of the ETAP). The following guidelines emerged from the two (2) considerations noted:
 - a. As much data as possible should be expressed in terms of Steps 3 and 4 of the ETAP, with Step 10 reserved for prerequisite competencies.
 - b. Analysis should be extended to the point where a novice could be expected to perform, as judged by an analyst.
 3. Job aids were an integral part of many of the major steps of the ETAP as originally presented. The focus, originally was on whether a job aid provided information for task performance and on analyzing the skills needed to use the job aid. Eventually, since prerequisite competencies were developed for use of job aids, the focus was in terms of resources (available, but not required for task performance) and intrinsic job aids (required for task performance).
 4. The ETAP originally provided extensive guidance for conducting original analysis interviews and much briefer mention of the verification and instructional review processes. Verification evolved as a rather straightforward process in which a second SME reviewed the write-up of the results of the original analysis interviews. It was an analyst responsibility to reconcile any differences. In a limited number of instances two sets of results were reported. Instructional review procedures were not as straightforward. The main concern in instructional review was establishing reasonable criteria as to whether a skill was taught or not taught. In addition to an interview

situation, criteria considered were: mention in the POI, stated in a lesson plan, contained on a test, required mastery on a test. A secondary concern was obtaining resources to do the review for BSEP II tasks. Consequently, instructional review data are not available for BSEP II tasks.

5. The ETAP as originally presented did not provide alternate procedures which could be used with shared or common tasks. To accommodate the situation, replicate analysis procedures were developed. Replicate analysis required that a task undergo original analysis and then be subjected to verification at subsequent analysis situations. These subsequent verifications could result in no changes, minor change, or major changes.
6. The ETAP provided very little guidance concerning data recording formats. Three basic formats were developed and are presented at Attachment F.
7. Other major concerns about the ETAP, and analysis in general, included identification of prerequisite competencies, the development and use of a taxonomy, and data handling via data processing results. These concerns are discussed in separate sections below.

Four basic formats for expression of analysis results were developed as part of the effort. Examples of each are at Attachment G. The first example is referred to as "old format." Derivation of the knowledge analysis form is explained in the section on taxonomy development. The second example is referred to as "new format". The third example, using TPA-X forms, was an experimental approach to recording transfer analysis results. The final example was used only at Ft. Sam Houston.

To provide guidance in reviewing and using analysis results, an explanation has been developed for all entries on analysis reports. This explanation is provided at Attachment H.

Most analysis results produced by enactment of the ETAP and other procedures were submitted to a review and finalization process. Guidance used during this process is provided at Attachment I. Selected MOS at Ft. Eustis (57H, 61C, 67G, 67T, 68B, 68D, 68F, 68H, 68J) and MOS 91B at Ft. Sam Houston were finalized based results of an exhaustive review accomplished by school representatives at the time of analysis. Also, no review comments were received for MOS 24C at Ft. Bliss and MOS 19E at Ft. Knox.

Taxonomy

As noted above, issues developed during analysis concerning full expression of analysis results and identification of skills not taught through the instructional review process. Also at issue was the need to develop and utilize a taxonomy, as described in GFM associated with the ETAP, and the need to differentiate between field analysis responsibilities and extended analysis (home office) responsibilities. Relevant actions taken in this area included the following:

1. Field analysis was initiated without the benefit of a taxonomy. The initial version of the data recording form (see Attachment F) provided for recording of information from Step 10 of the ETAP and for recording instructional review (IR) information. Also, the knowledge analysis form (KA) was developed to differentiate extended analysis (home office) responsibilities from field analysis responsibilities (see Example 1 of Attachment G).
2. As field analysis and extended analysis progressed the need for a taxonomy became apparent. It was perceived that a taxonomy would assist in the following areas:
 - a. Serve as a communication device across the complete project.
 - b. Increase reliability of skill identification for both field analysts and home office reviewers.
 - c. Initiate input for test development.
 - d. Assist in the identification and description of prerequisite competencies.
 - e. Lead to efficiencies in recording analysis information.
3. Based on a review of relevant GFM and project definitions, issues addressed during the initial portions of analysis, results of initial analysis at field locations, and consultations with the COR, initial taxonomy categories were identified and defined. This information was provided to analysts as part of the data recording form. This level of taxonomy development is shown as Item 1 at Attachment J. The categories provided a gross coding scheme that could be used with results from Step 10 of the ETAP.
4. Using results from the ETAP and follow-on discussions with analysts and the COR, the first expansion of the taxonomy was fielded with fifteen (15) categories and ninety-three (93) subcategories. Analysts continued to record the results of Step 10 of the ETAP and to code the statements in accordance with the taxonomy. Reviewers at the home office also used the taxonomy when developing the KA form. A copy of the expanded taxonomy is shown as Item 2 at Attachment J.
5. The final version of the taxonomy is shown as Item 3 at Attachment J. It contains thirty-six (36) categories and two hundred (200) subcategories. Motor skills are also included in this elaborated taxonomy. When the elaborated taxonomy was used both analysts and home office reviewers coded directly onto the data recording forms (see Example 2 at Attachment G).
6. All analysis reporting was in terms of the codes from the elaborated taxonomy. An explanation of coding conversion is provided as item 4 at Attachment J.

Data Processing and Subtasks

As noted above data processing and identification and utilization of subtasks, were integral to operationalizing the ETAP across various analysis locations. Data processing equipment entered into the analysis operation in the following manner:

1. Home office and field locations were linked in a conversational MEMO system so directions, information, and guidance could be shared.
2. Subtask index and subtask text (as described below) were made available to analysts following verification that subtask usage was appropriate.
3. Analysis results were entered into the system and all analysis and summary reports were machine generated. A complete description of analysis-related reports produced via data processing is provided at Attachment K.

Conceptually, it was anticipated that various levels of redundancy would occur in the analysis effort. The levels of redundancy were as follows:

1. Complete task duplication. This situation was handled via replicate analysis procedures as described above.
2. Repetition of prerequisite competencies. This situation was handled via development of the data recording forms and taxonomy as described above.
3. Repetition of portions of task analysis results across two or more tasks. This situation was handled via conventional cross-referencing techniques and through utilization of subtasks. The subtask effort is described below.

Subtasks were focused on for two purposes in the analysis effort. First, due to the large number of MOS under analysis and similarity across MOS and CMF, it was reasonable to expect redundancy across tasks for portions of task analysis results. Second, (this holds true if the first statement is true) the amount of time needed for analysis could be reduced. The following factors were important in the subtask effort:

1. Clear definitions and guidelines were needed for subtasks. Such definitions and guidelines were developed and used by both home office personnel and field analysts.
2. Responsibility for identification of subtasks needed to be specified. The initial effort was undertaken by home office personnel. The ongoing effort was assumed by field analysts.
3. Information needed to be readily available so analysts could assess the likelihood of the availability of subtasks. For this purpose the subtask index was developed and updated biweekly.

4. Full text of subtasks needed to be available so analysts could judge usability and include in analysis results. Availability was provided via mail and the data processing system.
5. Technical accuracy (as to applicability) needed to be maintained. The analysts were responsible to ensure that SME verified the applicability of subtasks.

In retrospect the subtask effort was only minimally productive. Main contributing causes to this situation were as follows:

1. Specificity of analysis results. It appears as if there is a continuum of specificity of analysis results -- at one end expression is so general that it is practically worthless and at the other end it is highly detailed, specific, and elaborated. The current effort was more toward the "end" of detail and specification. Thus, portions of analysis results were generally unusable, without minor to major adjustments, across tasks.
2. Data recording conventions. To make full utilization of a subtask concept, it appears that cross-referencing must be prohibited by directive. There is a strong tendency for analysts to prefer use of cross-referencing techniques.

Two (2) subtask products were produced on the current effort. The first, a rather comprehensive index of prospective subtasks is provided at Attachment L. The second, a list of subtasks actually processed and used is provided at Attachment M.

MOS Summaries

In a previous section general statements were made concerning the usability of the ETAP. These statements reflect project-wide issues and home office areas of influence. However, on a day-to-day basis each analysis location was responsible for its own work effort. To a large extent each location coped with and solved its own problems within broad guidelines provided by the home office. In an effort to capture the "flavor" of daily operations and to provide a record of major problems and accomplishments, analysts were asked to provide MOS summaries. These summaries, with only minor spelling and copy edit changes, are provided at Attachment N.

Taxonomy Summaries

As noted in the section on the ETAP, collecting instructional review information presented conceptual and BSEP II logistical concerns. Consequently, using available resources, interviews were conducted to attempt to identify which prerequisite competencies were instructed and which were not instructed for BSEP I tasks. The results of the effort are presented at Attachment O. Prior to using the results additional verification is recommended.

ATTACHMENT A

MOS and Location Listing

MOS #	MOS Title	Analysis Location	Instructional Review Location	
			1	2
000	Common Soldier's Tasks			
05B	Radio Operator	Ft. Gordon		
05C	Radio Teletype Operator	Ft. Gordon		
05G	Signal Security Specialist	Ft. Devens		
11B	Infantryman	Ft. Benning		
11C	Indirect Fire Infantryman	Ft. Benning		
11H	Heavy Antiarmor Weapons Crewman	Ft. Benning		
11M	Fighting Vehicle Infantryman	Ft. Benning		
12B	Combat Engineer	Ft. Benning		
13B	Cannon Crewman	Ft. Leonard Wood		
13E	Cannon Fire Direction Specialist	Ft. Sill		
13F	Fire Support Specialist	Ft. Sill		
15D	Lance Missile Crew Member	Ft. Sill		
15E	Pershing Missile Crew Member	Ft. Sill		
16D	HAWK Missile Crew Member	Ft. Sill		
16E	HAWK Fire Control Crew Member	Ft. Bliss		
16H	ADA Operations and Intelligence Assistance	Ft. Bliss		
16P	ADA Short Range Missile Crewman	Ft. Bliss		
17B	Field Artillery Radar Crew Member	Ft. Bliss		
17C	Field Artillery Target Acquisition Specialist	Ft. Sill		
17K	Ground Surveillance Radar Crewman	Ft. Sill		
19D	Cavalry Scout	Ft. Huachuca		
19E	M48-M60A1/A3 Armor Crewman	Ft. Knox		
24C	Improved HAWK Firing Section Mechanic	Ft. Knox		
24H	Improved HAWK Fire Control Repairer	Ft. Bliss		
26L	Tactical Microwave Systems Repairer	Redstone Arsenal		
26Q	Tactical Satellite/Microwave Systems Operator	Ft. Gordon		
27E	Tow/Dragon Repairer	Ft. Gordon		
31J	Teletypewriter Repairer	Redstone Arsenal		
31M	Multichannel Communications Equipment Operator	Ft. Gordon		
31N	Tactical Circuit Controller	Ft. Gordon		
31V	Tactical Communications Systems Operator/Mechanic	Ft. Gordon		
32D	Station Technical Controller	Ft. Sill		
32V	Fixed Station Radio Repairer	Ft. Gordon		

Instructional

Review Location

MOS #	MOS Title	Analysis Location	Review Location
33S	EW/Intercept Equipment Repairer	Ft. Devens	Ft. Devens
33K	Avionic Mechanic	Ft. Gordon	Ft. Gordon
36C	Wire Systems Installer/Operator	Ft. Gordon	Ft. Gordon
36K	Tactical Wire Operations Specialist	Ft. Gordon	Ft. Gordon
43E	Parachute Rigger	Ft. Lee	Ft. Lee
43M	Fabric Repair Specialist	Ft. Lee	Ft. Lee
44B	Metal Worker	Aberdeen Proving Ground	Aberdeen Proving Ground
44E	Machinist	Aberdeen Proving Ground	Aberdeen Proving Ground
45B	Small Arms Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
45K	Tank Turret Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
52C	Utilities Equipment Repairer	Ft. Belvoir	Ft. Belvoir
52D	Power Generation Equipment Repairer	Ft. Belvoir	Ft. Belvoir
54E	Chemical Operations Specialist	Ft. McClellan	Ft. McClellan
55B	Ammunition Specialist	Redstone Arsenal	Redstone Arsenal
55D	Explosive Ordnance Disposal Specialist	Redstone Arsenal	Redstone Arsenal
57E	Laundry and Bath Specialist	Ft. Lee	Ft. Lee
57H	Terminal Operations Coordinator	Ft. Eustis	Ft. Eustis
61B	Watercraft Operator	Ft. Eustis	Ft. Eustis
61C	Watercraft Engineer	Ft. Eustis	Ft. Eustis
62B	Construction Equipment Repairer	Ft. Leonard Wood	Ft. Leonard Wood
62E	Heavy Construction Equipment Operator	Ft. Belvoir	Ft. Belvoir
63G	Fuel and Electrical Systems Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
63H	Track Vehicle Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
63N	M60A1/A3 Tank System Mechanic	Ft. Knox	Ft. Knox
63W	Wheel Vehicle Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
64C	Motor Transport Operator	4	4
67G	Airplane Repairer	Ft. Eustis	Ft. Eustis
67N	Utility Helicopter Repairer	Ft. Eustis	Ft. Rucker
67T	Tactical Transport Helicopter Repairer	Ft. Eustis	Ft. Eustis
67U	Medium Helicopter Repairer	Ft. Eustis	Ft. Eustis
67V	Observation/Scout Helicopter Repairer	Ft. Eustis	Ft. Rucker
67Y	Attack Helicopter Repairer	Ft. Eustis	Ft. Eustis
68B	Aircraft Powerplant Repairer	Ft. Eustis	Ft. Eustis
68D	Aircraft Powertrain Repairer	Ft. Eustis	Ft. Eustis
68F	Aircraft Electrician	Ft. Eustis	Ft. Eustis
68G	Aircraft Structural Repairer	Ft. Eustis	Ft. Eustis

MOS #	MOS Title	Analysis Location	Instructional Review Location
68H	Aircraft Pnedraulics Repairer	Ft. Eustis	5
68J	Aircraft Fire Control Repairer	Ft. Eustis	Ft. Eustis
68M	Aircraft Weapon Systems Repairer	Ft. Eustis	Ft. Eustis
71D	Legal Clerk	Ft. Harrison	Ft. Harrison
71L	Administrative Specialist	Ft. Harrison	Ft. Jackson
71M	Chapel Activities Specialist	Ft. Monmouth	Ft. Monmouth
71P	Flight Operations Coordinator	Ft. Rucker	Ft. Rucker
71Q	Journalist	Ft. Harrison	Ft. Harrison
72E	Telecommunications Center Operator	Ft. Gordon	Ft. Gordon
74D	Computer/Machine Operator	Ft. Harrison	Ft. Harrison
74F	Programmer/Analyst	Ft. Harrison	6
75B	Personnel Administration Specialist	Ft. Harrison	Ft. Harrison
76C	Equipment Records and Parts Specialist	Ft. Lee	Ft. Lee
76P	Material Control and Accounting Specialist	Ft. Lee	Ft. Lee
76V	Material Storage and Handling Specialist	Ft. Lee	Ft. Lee
76W	Petroleum Supply Specialist	Ft. Lee	Ft. Lee
76X	Subsistence Supply Specialist	Ft. Lee	Ft. Lee
76Y	Unit Supply Specialist	Ft. Lee	Ft. Lee
82C	Field Artillery Surveyor	Ft. Sill	Ft. Sill
91B	Medical Specialist	Ft. Sam Houston	Ft. Sam Houston
93J	ATC Radar Controller	Ft. Rucker	Ft. Rucker
94B	Food Service Specialist	Ft. Lee	Ft. Lee
95B	Military Police	Ft. McClellan	Ft. McClellan
95C	Correctional Specialist	Ft. McClellan	Ft. McClellan
96B	Intelligence Analyst	Ft. Huachuca	Ft. Huachuca

NOTES

1. Instructional review was performed for IET and skill level-2 resident trained tasks.
2. Performed at proponent schools: Ft. Knox, Ft. McClellan, Ft. Eustis, Ft. Sam Houston, Ft. Benning, Ft. Bliss, Ft. Belvoir, and Ft. Gordon.
3. Instructional reviewed performed for original analysis only.
4. Analysis performed at Ft. Leonard Wood and Ft. Eustis, instructional review performed at Ft. Leonard Wood
5. Performed by Government personnel at Chanute Air Force Base.
6. Performed at both Ft. Harrison and Ft. Lee.

ATTACHMENT B

Analysis Per Location and Date

Location (X = Operation)

Date	Aberdeen	Belvoir	Benning	Bliss	Devens	Eustis	Gordon	Harrison	Sam Houston	Huachuca	Knox	Lee	McClellan	Monmouth	Redstone Arsenal	Rucker	Sill	Leonard Wood	Total Number of Analyst	
June 1981	X			X		X	X	X												11
July 1981	X			X		X	X	X				X					X			13
August 1981	X			X		X	X	X				X					X			14
September 1981	X			X		X	X	X			X	X					X			14
October 1981	X		X	X		X	X	X			X	X	X	X	X	X	X			24
November 1981	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			28
December 1981	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			28
January 1982	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	28
February 1982	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	28
March 1982	X	X	X	X	X	X	X	X	X		X	X	X		X		X	X	X	29
April 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	32
May 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	33
June 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	33
July 1982	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29
August 1982		X	X	X		X	X	X	X			X	X		X	X	X	X	X	24
September 1982		X	X			X	X	X	X			X	X		X					15
October 1982			X			X			X				X		X					14
November 1982						X			X											5
December 1982						X			X											3

ATTACHMENT C

Analysis Results Summary

ANALYSIS RESULTS

		RANGE	MEDIAN	MEAN
ABERDEEN	(446)	28.6	6.5	9.5
BELVOIR	(213)	6.3	8.0	9.0
BENNING	(554)	27.6	7.3	11.7
BLISS	(539)	13.5	9.4	8.9
DEVENS	(80)	8.8	11.3	11.3
EUSTIS	(1,325)	19.9	8.8	9.4
GORDON	(840)	17.5	9.6	10.3
HARRISON	(233)	15.8	12.4	12.9
SAM HOUSTON	(121)	-	-	6.4
HUACHUCA	(107)	4.7	6.1	6.0
KNOX	(437)	2.5	4.3	3.8
LEE	(575)	7.5	6.4	7.2
McCLELLAN	(420)	1.7	5.7	5.7
MONMOUTH	(90)	-	-	7.7
REDSTONE	(335)	11.0	14.4	14.3
RUCKER	(133)	4.7	4.6	4.6
SILL	(843)	2.9	4.1	4.3
LEONARD WOOD	(188)	4.7	5.9	5.9
SUMMARY	7479*	26.1	6.9	8.3

*COMMON TASKS = 89 PLUS 178 REPLICATES

ATTACHMENT D

Cumulative Number of Tasks Analyzed/MOS/Month

Cumulative Number of Tasks Analyzed

	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
MCS	10	29	75	84		85	(4) 84		85		86								
44a				16	33	57	61												
44E																			
45B							2	21	49	77	95								
45K										14			45						
53C						4	10	18	27	32	35	38	40	46					
63H						20	36	41	48	49	52	53							
63W		5	23	42	61	60			(6) 59		60								
128													43	48					
52C													18	34	60				
52D							5	16	34	43	56	66							
52E																6	39		
52F												(10) 19	29	40	50	52	86	118	
112						11		19	29	41	43		8	18	37	54	102	167	
113															34	84	92	110	
114																64	101	159	

Cumulative Number of Tasks Analyzed

	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
605																			
60D	10	49	55				56							67					
60E	10	35	46	67	84	117	120				126			137		138			
60F												10	45	76	98				
60P									11	17	19								
64C				10	12	54	75	92	129	164	213		215	217					
655			1							35	38	44							
665													15	36					
67H																	2	25	103
61B	8	18	34	87	104	(2) 93												(16) 20	84
61C																			
67G												18		36	39	46	59	76	93
67N									7	16	29	65	79	80					
67T																		2	52
67U		3	11	27	37	51	56	89	114										
67V										11	28	37	50	73					

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
67Y									45	64	80	84							
68B												15		36		42	71	102	116
68D															18	32	40	49	
68F																		23	38
68G	10	16	28	49					56			(11) 55							
68H															10			33	34
68J					10	15		19	23	36	43	49	56	(15) 55		65	79	107	151
68M								6	9	17	24	31	41	42			82	99	106
05B	9	39	63			(3) 55	(5) 54		(7) 61			(12) 53							
05C		20	37	74		75				63		(13) 61							
26L	3	13	29																
26Q	3	13	51	73		83	85					(14) 80	83	(16) 81	83				
31J									3	7	13	17	27	32	35	36			
31M	3	11	13			17	33	59	82										
31F	2						(8) 1									56	72	88	

Cumulative Number of Tasks Analyzed

	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
32C			1										46						
32H	1													14	27	33	37	40	
35K					11	36	46	49	56					57		58			
36C			1	2	8	41	51	79	110	127	138								
36K		6	13							34	24	52	76						
72E			2	3									41	52					
71D	3	6	48									53							
71L	3	16	21						41										
71G					21	25						31		33					
74D									9	18	27	33							
74F												4		6	9	15			
75B			33	50	51				53										
91B											10	15	46	72	86	99	100	109	121
17K									14			19	41	66					
96B						10	38							41					

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
19D				12	36				44	57	83	93	96	170					
19E				12	44	64	70	84	104	112	126		128	148					
63N							13	15	17	35	46	80	119						
43E											20		69	70					
43M			8	28		37			40										
57E						42													
76C										41									
76P															46	121			
76V									9	25	60								
75W									59										
76X							31												
76Y											15		44						
925									67										
51E														9	62	138			
926						4	6		14		18	24	27	33	54	121	153	17	

[illegible]

Cumulative Number of Tasks Analyzed

	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
ALL	2																		
11Y										3	33	58	73	97					
82C										30	54	84	103	127	143	161			
82B									2	20	29								
84C																			
84B																			
84A																			
83C																			
83B																			
83A																			
82C Replicates							6	11	18	25	32	45	62	75	81		83	87	
														96	131		139	174	

Notes:

- (1) Based on Task List (TL)/Soldier's Manual (SM) task count change.
- (2) Based on TL/SM task count change.
- (3) Based on change in replicate analysis procedure.
- (4) Based on TL/SM task count change.
- (5) Based on change in replicate analysis procedure.
- (6) Based on TL/SM task count change.
- (7) Based on change in replicate analysis procedure.
- (8) Based on change in replicate analysis procedure.
- (9) Based on change in replicate analysis procedure.
- (10) Based on removal of common task from MOS task count.
- (11) Based on TL/SM task count change.
- (12) Based on TL/SM task count change.
- (13) Based on change in replicate analysis procedure.
- (14) Based on change in replicate analysis procedure.
- (15) Based on TL/SM task count change.
- (16) Based on TL/SM task count change.

ATTACHMENT E

Final Status Report

TASK STATUS

<u>MOS</u>	<u>ANALYSIS START DATE</u>	<u>TOTAL TASKS</u>	<u>*AVG TIME PER TASK</u>
<u>*Aberdeen Proving Ground</u>		<u>446</u>	
44B	8 Jun 81	86	3.1
44E	14 Sep 81	61	7.0
45B	11 Dec 81	95	6.3
45K	25 Jan 82	45	4.8
63G	19 Oct 81	46	31.7
63H	2 Nov 81	53	6.0
63W	8 Jun 81	60	7.9
<u>*Ft. Belvoir</u>		<u>213</u>	
12B	15 Apr 82	48	7.4
52C	6 May 82	60	6.8
52D	23 Nov 81	66	13.1
62E	9 Aug 82	39	8.7
<u>*Ft. Benning</u>		<u>554</u>	
11B	13 Oct 81	118	29.9
11C	7 Jun 82	167	11.4
11H	30 Jul 82	110	3.3
11M	20 Sep 82	159	2.3
<u>*Ft. Bliss</u>		<u>539</u>	
16D	8 Jun 81	67	8.7
16E	8 Jun 81	138	5.8
16H	23 Mar 82	98	9.4
16P	23 Nov 81	19	17.0
24C	14 Sep 81	217	3.5
<u>*Ft. Devens</u>		<u>80</u>	
05G	18 Jan 82	44	6.9
33S	17 Mar 82	36	15.7
<u>*Ft. Eustis</u>		<u>1325</u>	
57H	2 Aug 82	103	5.3
61B	8 Jun 81	93	5.1
61C	14 Jun 82	84	7.3

TASK STATUS (cont)

<u>MOS</u>	<u>ANALYSIS START DATE</u>	<u>TOTAL TASKS</u>	<u>*AVG TIME PER TASK</u>
<u>Ft. Eustis (cont)</u>			
67G	19 Apr 82	93	11.3
67N	9 Dec 81	80	10.6
67T	27 Sep 82	52	6.2
67U	29 Jun 81	114	8.2
67V	25 Jan 82	73	8.0
67Y	7 Dec 81	84	8.4
68B	19 Apr 82	116	7.9
68D	21 Jun 82	49	9.7
68F	8 Sep 82	38	9.5
68G	8 Jun 81	55	9.6
68H	19 Jul 82	34	9.8
68J	5 Oct 81	151	8.3
68M	1 Feb 82	106	25.0
<u>*Ft. Gordon</u>		<u>840</u>	
05B	8 Jun 81	53	6.2
05C	17 Aug 81	61	4.0
26L	8 Jun 81	29	11.8
26Q	17 Aug 81	83	4.8
31J	18 Jan 82	36	21.5
31M	2 Nov 81	82	4.8
31N	14 Jun 82	86	8.9
32D	18 Jan 82	46	15.6
32H	7 Jun 82	40	16.7
35K	14 Sep 81	58	10.2
36C	5 Oct 81	138	10.1
36K	28 Feb 82	76	6.6
72E	16 Feb 82	52	13.0
<u>*Ft. Benjamin Harrison</u>		<u>233</u>	
71D	8 Jun 81	53	13.0
71L	8 Jun 81	41	12.4
71Q	18 Sep 81	33	12.4
74D	25 Jan 82	38	5.7
74F	24 May 82	15	21.5
75B	7 Aug 81	53	12.4
<u>*Ft. Sam Houston</u>		<u>121</u>	
91B	31 Mar 82	121	6.4

TASK STATUS (cont)

<u>MOS</u>	<u>ANALYSIS START DATE</u>	<u>TOTAL TASKS</u>	<u>*AVG TIME PER TASK</u>
<u>*Ft. Huachuca</u>		<u>107</u>	
17K	17 Apr 82	66	8.5
96B	9 Nov 81	41	3.8
<u>*Ft. Knox</u>		<u>437</u>	
19D	8 Sep 81	170	3.0
19E	8 Sep 81	148	3.0
63N	2 Nov 81	119	5.5
<u>*Ft. Lee</u>		<u>575</u>	
43E	8 Apr 82	70	5.9
43M	27 Jul 81	40	9.3
57E	7 Sep 81	42	9.8
76C	8 Feb 82	41	6.3
76P	7 Jun 82	121	10.5
76V	25 Jan 82	60	5.8
76W	8 Jan 82	59	3.0
76X	23 Nov 81	31	6.5
76Y	29 Mar 82	44	10.4
94B	1 Dec 81	67	4.5
<u>*Ft. McClellan</u>		<u>420</u>	
54E	3 May 82	138	4.8
95B	26 Oct 81	188	5.8
95C	21 Jun 82	94	6.5
<u>*Ft. Monmouth</u>		<u>90</u>	
71M	15 Oct 81	90	7.7
<u>*Reastone Arsenal</u>		<u>335</u>	
24H	6 May 82	73	19.7
27E	26 Oct 81	65	16.5
55B	26 Oct 81	87	8.7
55D	31 Mar 82	110	12.4

TASK STATUS (cont)

<u>MOS</u>	<u>ANALYSIS START DATE</u>	<u>TOTAL TASKS</u>	<u>*AVG TIME PER TASK</u>
<u>*Ft. Rucker</u>		<u>133</u>	
71P	22 Jun 82	70	2.2
93J	13 Oct 81	63	6.9
<u>*Ft. Sill</u>		<u>843</u>	
13B	4 Jan 82	114	3.1
13E	17 Sep 81	125	4.5
13F	6 Jul 81	82	3.1
15D	20 Aug 81	84	4.4
15E	29 Mar 82	124	5.1
17B	20 May 82	84	5.8
17C	22 Mar 82	60	4.4
31V	7 Jun 82	97	2.9
82C	22 Mar 82	73	5.5
<u>*Ft. Leonard Wood</u>		<u>188</u>	
62B	2 Feb 82	161	8.2
64C	15 Mar 82	27	3.5
*Common Tasks (Analyzed at Proponent School)			
000		89	
<u>000 Replicates</u>		<u>178</u>	
95		7746	8.5

*Time per task includes planning, interview, verification, instructor review and write-up as reported on analysis time sheets

ATTACHMENT F

Data Recording Forms

TASK ANALYSIS DATA SUMMARY - I

TASK NO:	SOURCE: DATE:	ANALYSIS LOCATION:
----------	------------------	-----------------------

TASK SYNOPSIS:

MAJOR EQUIPMENT AND TEST EQUIPMENT ITEMS:

ANALYST:	SME: DATE:	SME: DATE:	INST. DATE:
DATE COMPLETED:			

COMMENTS:

Level I Summary:

- 1A:
- 1B:
- 1C:
- 1D:
- 1E:
- 1F:
- 1G:
- 1H:
- 1I:
- 1J:

ASK NO.

TASK ANALYSIS AIA SUMMARY 2

Page of

level 1

level

level	level
A	A
B	B
C	C
D	D
A	A
B	B
C	C
D	D
A	A
B	B
C	C
D	D
A	A
B	B
C	C
D	D
A	A
B	B
C	C

TASK NO.

TASK ANALYSIS DATA SUMMARY

Page

Level	Knowledge
	A
	B
	C
	D
	E
	A
	B
	C
	D
	E
	A
	B
	C
	D
	E
	A
	B
	C
	D
	E

TASK PERFORMANCE ANALYSIS

PAGE 1 OF _____

MOS _____			
Task No. _____ Statement _____ _____		Soldier's Manual, Publication Date _____ _____ _____	
Location _____ Analyst _____ _____		Date Started: _____ Date Completed: _____ Total Hours: _____	
SME _____ Date _____	SME _____ Date _____	Inst. _____ Date: _____	
Task Synopsis _____ _____ _____ _____			
Major Equipment and _____ Test Equipment Items: _____ _____ _____			
Comments. _____ _____ _____ _____			

MAJOR STEPS

I. _____ _____ _____	VI. _____ _____ _____
II. _____ _____ _____	VII. _____ _____ _____
III. _____ _____ _____	VIII. _____ _____ _____
IV. _____ _____ _____	IX. _____ _____ _____
V. _____ _____ _____	X. _____ _____ _____

CATEGORY DEFINITIONS

CATEGORY

READING:

1. **Procedural Directions** To obtain information from a highly-detailed, step-by-step description in order to accomplish a specific task activity.
2. **Process** Applying information presented in a job aid, where reading is required in combination with the use of graphics, maps, exploded view diagrams and schematics in order to perform a sub-task activity.
3. **Locator** Using written aids (Tables of Contents, Appendixes, Indexes, Dictionaries, Directories...) in order to locate more detailed sub-task related information.
4. **Specifications** Using tables, graphs, charts, or written text to determine a fact, standard, tolerance, or rule to which a sub-task procedure must conform.
5. **Terminology** Recognizing and applying task-specific vocabulary, jargon and abbreviations used in the job environment.
6. **Recognition** Identifying, within sub-tasks, distinctions to be made regarding symbols sizes, shapes, colors and sounds.
7. **Safety** Observing rules and precautions that must be exercised during sub-task activities in order to prevent injury to self or equipment.

MATHEMATICS:

8. **Numeration/ Place Value** Those activities requiring numbering, counting, or reading numbers (on a gauge, on a rule, and on scale divisions). Includes recognizing numbers in various forms: whole fractions, decimals, and percents.
9. **Addition/ Subtraction** Solving problems which require the use of addition and subtraction facts. Using symbols + or -, positive and negative.
10. **Multiplication/ Division** Solving problems using multiplication and division to arrive at a correct product or quotient.
11. **Geometry** That area having to do with measurement and relationships of points, lines, angles and figures. Using ruler, yardstick, meter divisions, identifying and constructing figures (plane and solid); solving mapping and trajectory computations.
12. **Algebra** Statement of relations, utilizing letters and other symbols to represent specific sets of numbers and values.
13. **Trigonometry** Mathematics dealing with the relations between the sides and angles of plane or spherical triangles and the calculations based on those relations.

WRITING

14. **Composition** Applying proper English skills, appropriate grammar, vocabulary and style, to the completion of a written sub-task activity.
15. **Spelling** The writing of letters in words in accordance with an acceptable form found in a dictionary, thesaurus, or word list specific to sub-task performance.

ADDITIONAL

16. **Equipment Use** Applying a conscious mental activity to the execution of a physical task or sub-task.
17. **Motor Skill** Employing an exclusively physical act in the performance of a sub-task identified within the procedure.
18. **Other**

TASK PERFORMANCE ANALYSIS

PAGE 1 OF _____

MOS _____			
Task No. _____ Statement _____ _____		Soldier's Manual, Publication Date: _____ _____ _____	
Location _____ Analyst _____ _____		Date Started: _____ Date Completed: _____ Total Hours: _____	
SME _____ Date _____	SME: _____ Date: _____	Inst. _____ Date: _____	
Task Synopsis _____ _____ _____ _____			
Major Equipment used _____ Test Equipment Items _____ _____ _____			
Comments _____ _____ _____ _____			

MAJOR STEPS

_____	VI. _____
_____	_____
_____	_____
_____	VII. _____
_____	_____
_____	_____
_____	VIII. _____
_____	_____
_____	_____
IV. _____	IX. _____
_____	_____
_____	_____
V. _____	X. _____
_____	_____
_____	_____

TASK #

KNOWLEDGE
ANALYSIS

TASK PERFORMANCE ANALYSIS

JA

NOT
TAUGHT

TASK #

PAGE ____ OF ____

LOCATION

N.T.

KNOWLEDGE STATEMENTS

MOTOR SKILLS45. Functions

- _____ a. Multi-Limb Coordination — coordinate gross movements requiring use of larger skeletal muscles for strength
- _____ b. Manual Dexterity — make skillful, controlled arm, hand movements in manipulating large objects under speed conditions
- _____ c. Control Precision — highly controlled, precise muscular adjustments, operating controls by hand, arm or foot movements. Speed and accuracy
- _____ d. Response Orientation — select appropriate response, each pattern of signals requires a different choice of controls and direction of movement. High speed and accuracy
- _____ e. Reaction Time — speed with which an individual is able to respond to an auditory or visual stimulus
- _____ f. Rate Control — make continuous anticipatory motor adjustments relative to changes in speed of a moving target. Pursuit and tracking
- _____ g. Finger Dexterity — skillful, controlled manipulations of small objects, primarily finger movements
- _____ h. Arm-Hand Steadiness — make precise arm-hand positioning movements where strength and speed are minimized
- _____ i. Wrist-Finger Speed — make rapid, precise turning, tapping, tripping, aligning motions in response to auditory or visual stimuli

Other: _____

46. Operations

- _____ a. Operate equipment or be a crew member engaged in manually lifting or moving objects
- _____ b. Uses hand tools considered to be common. Determines sizes and selection. Pliers, screwdrivers, hand drills. . . Simple mechanical operations, mainly remove and replace
- _____ c. Install, relocate and remove
- _____ d. Adjust, repair, maintain mechanical, electrical, hydraulic systems or subsystems. Disassemble and assemble, using hand tools
- _____ e. Testing equipment used in the production, transmission, distribution, and utilization of energy sources
- _____ f. Cutting, bending, trimming, welding, riveting, etc. to force, shape or fabricate materials
- _____ g. Operator checks and services in response to a variety of external stimuli (sounds and sights)
- _____ h. Possess the physical ability to perform in combat or police actions
- _____ i. Clerical duties, maintaining records, operating office machines, processing data using electronic machines
- _____ j. Perform acts requiring skill and care of injured or infirmed persons

Other: _____

ATTACHMENT G

Examples of ETAP Results

Example 1: "Old Format"

Example 2: "New Format"

Example 3: TPA-X

Example 4: Ft. Sam Houston

Example 1: "Old Format"

CONTRACT NO. DAB160-81-C 0017 DATE PRINTED:
COMPLETE EXTENDED TASK ANALYSIS PROCEDURES RESULTS 02/25/83
TPA-1

MOS: 96B INTELLIGENCE ANALYST
TASK NUMBER: 301-336-2504 BSEP II
PREPARE LIST OF MAP REQUIREMENTS
FOR AN OPERATION
ANALYSIS SITE: HAUC

MANUAL: FM 34-96B 1/2 (APRIL 1980)
DATE STARTED: 151281 DATE COMPLETED: 211281 HOURS: 2
ORIGINAL ANALYSIS: 151281 VERIFICATION: 171281 INSTRUCTIONAL REVIEW: 211281

----- TASK SYNOPSIS -----
DETERMINE MAPS NEEDED FOR A PARTICULAR UNIT OR MISSION.

----- EQUIPMENT -----
GIVEN UNIT MISSION, CURRENT MAP INDEX, AREA OF OPERATIONS, AREA OF INTEREST.

----- COMMENTS NO ERRATA -----
THIS IS RARELY DONE BY A 96B. IT IS BASICALLY DETERMINING WHAT MAPS ARE
NEEDED FOR A UNIT MISSION. LOCAL SOP DICTATES WHO AND HOW MAPS ARE ACTUALLY
OBTAINED. SOME 96B WILL DO THIS.

----- MAJOR STEPS -----
1. DETERMINE MAPS NEEDED.

----- MOTOR SKILLS NOT ANALYZED -----
45A MULTI-LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D RESPONSE ORIENTATION
45E REACTION TIME
45F RATE CONTROL
45G FINGER DEXTERITY
45H ARM/HAND STEADINESS
45I JITTER/FINGER SPEED
45J CARE FOR THE INJURED OR INFIRM
46A OPERATE EQUIPMENT - MANUALLY LIFT
46B USE HAND TOOLS - DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORCE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND SERVICES
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

1. < DETERMINE MAPS NEEDED.
 1.A. < DETERMINE THE AREA OF MAP COVERAGE.
 1.A.1. < OBTAIN AREA TO BE COVERED FROM SUPERVISOR.
 1.A.2. < OR LOCATE THE AREA OF OPERATIONS ON GENERAL PLANNING OR
 OTHER LARGE AREA MAP.
 1.B. < DETERMINE THE TYPE OF MAP NEEDED.
 1.B.1. \$ < DETERMINE WHAT THE MAP WILL BE USED FOR FROM THE UNIT
 MISSION.
 1.B.2. < DETERMINE TYPE OF MAP & SCALE.
 1.B.2.A. < FIND THE MAP USED UNDER FM 34-968, TASK 301-336-2504,
 STEP 1.C (TACTICAL, FOR EXAMPLE).
 1.B.2.B. < READ THE MAP SCALE, MOST COMMONLY USED NEXT TO IT'S USE.
 1.C. < SELECT & OBTAIN MAPS REQUIRED FOR AN OPERATION.
 1.C.1. \$ < FIND THE AREA TO BE COVERED ON THE CURRENT MAP INDEX.
 1.C.2. \$ < LIST IDENTIFYING INFORMATION FOR EACH MAP NEEDED FROM
 INDEX.
 1.C.2.A. < INCLUDE SERIES NUMBER.
 1.C.2.B. < INCLUDE SHEET NUMBER.
 1.C.2.C. < INCLUDE THE MAP SCALE.
 1.C.2.D. < INCLUDE THE QUANTITY NEEDED.
 1.C.2.E. < INCLUDE THE EDITION NUMBER IF KNOWN, IF NOT KNOWN
 REQUEST THE MOST RECENT EDITION.
 1.C.3. < SUBMIT LIST OF REQUIRED MAPS TO SUPERVISOR (END OF TASK).

DATE PRINTED:
03/07/83

CONTRACT NO. DAB16W 81 C-0017
MOS: 96B TASK NUMBER: 301-336-2504

TPA-3
PAGE 1

STATEMENT	CATEGORY	STEP NUMBER	IR
FIND LOCATIONS ON MAP	25	1.A.	
READ UNIT MISSION	25	1.B.	\$
DETERMINE MAP TYPE FROM UNIT MISSION	25	1.B.	\$
DETERMINE WHAT MAP SCALE TO USE	25	1.B.	
DETERMINE WHAT MAP SCALE TO USE	28	1.B.	
USE MAP INDEX	25	1.C.	\$
USE MAP INDEX	27	1.C.	\$
USE MAP INDEX	28	1.C.	\$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	25	1.C.	\$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	27	1.C.	\$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	28	1.C.	\$
PREPARE LIST OF MAP TO PRESENT TO SUPERVISOR	36	1.C.	\$

CONTRACT NO. DABT60-81-C-0017

DATE PRINTED:
03/07/83

MOS: 96B TASK NUMBER: 301-336-2504

KNOWLEDGE
ANALYSIS
PAGE 1

CATEGORY STEP NUMBER

STATEMENT

28B I.B
KLEAD UNIT MISSION STATEMENT TO DETERMINE WHICH OF THE 8 TYPES OF MAPS WILL BE
REQUIRED; MAP TYPES LISTED IN FM 34-96B PAGE 2-259
27C I.C
SELECT AND OBTAIN MAPS REQUIRED FOR AN OPERATION: FIND THE GEOGRAPHICAL AREA
TO BE COVERED ON THE CURRENT MAP INDEX
28C I.C
SUBMIT LIST OF REQUIRED MAPS TO SUPERVISOR

32E I.C
LIST IDENTIFYING INFORMATION FOR EACH MAP NEEDED: SERIES AND SHEET NUMBERS MAP
SCALE; QUANTITY NEEDED; EDITION NUMBER

Example 2: "New Format"

MOS- 31V TACTICAL COMMUNICATIONS SYSTEMS OPERATOR/MECHANIC
TASK NUMBER: 113-587-3074 BSLP I ANALYSIS SITE: SILL
EVALUATE THE OPERATION OF RADIO SETS AN/VRC-53/64

TASK SYNOPSIS

RADIO SET AN/VRC 53/64, DA FORM 2404, TEST SET, RADIO FREQUENCY POWER
AN/URM-182 (WATT METER). DISTANT OPERATIONAL COMPATIBLE RADIO SET
EQUIPMENT

SEE COMMENTS ATTACHED

MAJOR STEPS

1. PERFORM INITIAL ADJUSTMENTS
2. VERIFY INSTALLATION
3. PRESET CONTROLS
4. INSTALL AN/URM-182 (WATT METER)
5. PERFORM EQUIPMENT PERFORMANCE CHECK (EPC)
6. REPORT RESULTS

45A MULTITASK COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D KNOWLEDGE ORIENTATION
45E REACTION TIME
45F MOTOR CONTROL
45G FINE MOTOR DEXTERITY
45H APPROXIMATE SITUATION
45I KNOWLEDGE OF PERSONS
45J KNOWLEDGE OF PLACES
45K KNOWLEDGE OF THINGS
45L KNOWLEDGE OF ORGANIZATIONS
45M KNOWLEDGE OF PROCESSES
45N KNOWLEDGE OF SYSTEMS
45O KNOWLEDGE OF TOOLS
45P KNOWLEDGE OF MATERIALS
45Q KNOWLEDGE OF EQUIPMENT
45R KNOWLEDGE OF METHODS
45S KNOWLEDGE OF PROCEDURES
45T KNOWLEDGE OF STANDARDS
45U KNOWLEDGE OF REGULATIONS
45V KNOWLEDGE OF LAWS
45W KNOWLEDGE OF CUSTOMS
45X KNOWLEDGE OF MANNERS
45Y KNOWLEDGE OF BEHAVIOR
45Z KNOWLEDGE OF ATTITUDE
45AA KNOWLEDGE OF MOTIVATION
45AB KNOWLEDGE OF EMOTION
45AC KNOWLEDGE OF COGNITION
45AD KNOWLEDGE OF AFFECT
45AE KNOWLEDGE OF CONSCIOUSNESS
45AF KNOWLEDGE OF PERSONALITY
45AG KNOWLEDGE OF SOCIAL BEHAVIOR
45AH KNOWLEDGE OF CULTURE
45AI KNOWLEDGE OF HISTORY
45AJ KNOWLEDGE OF GEOGRAPHY
45AK KNOWLEDGE OF SCIENCE
45AL KNOWLEDGE OF ARTS
45AM KNOWLEDGE OF LITERATURE
45AN KNOWLEDGE OF MUSIC
45AO KNOWLEDGE OF DANCE
45AP KNOWLEDGE OF THEATRE
45AQ KNOWLEDGE OF FILM
45AR KNOWLEDGE OF TV
45AS KNOWLEDGE OF RADIO
45AT KNOWLEDGE OF PRESS
45AU KNOWLEDGE OF PUBLICATIONS
45AV KNOWLEDGE OF INFORMATION
45AW KNOWLEDGE OF COMMUNICATION
45AX KNOWLEDGE OF TRANSPORTATION
45AY KNOWLEDGE OF TRAVEL
45AZ KNOWLEDGE OF TOURISM
45BA KNOWLEDGE OF RECREATION
45BB KNOWLEDGE OF SPORTS
45BC KNOWLEDGE OF GAMES
45BD KNOWLEDGE OF Hobbies
45BE KNOWLEDGE OF COLLECTIONS
45BF KNOWLEDGE OF HOBBIES
45BG KNOWLEDGE OF INTERESTS
45BH KNOWLEDGE OF ACTIVITIES
45BI KNOWLEDGE OF OCCUPATIONS
45BJ KNOWLEDGE OF VOCATIONS
45BK KNOWLEDGE OF CAREERS
45BL KNOWLEDGE OF PROFESSIONS
45BM KNOWLEDGE OF INDUSTRIES
45BN KNOWLEDGE OF BUSINESSES
45BO KNOWLEDGE OF COMPANIES
45BP KNOWLEDGE OF FIRMS
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45BR KNOWLEDGE OF INSTITUTIONS
45BS KNOWLEDGE OF ORGANIZATIONS
45BT KNOWLEDGE OF AGENCIES
45BU KNOWLEDGE OF BUREAUS
45BV KNOWLEDGE OF DEPARTMENTS
45BW KNOWLEDGE OF DIVISIONS
45BX KNOWLEDGE OF SECTIONS
45BY KNOWLEDGE OF BRANCHES
45BZ KNOWLEDGE OF SUBDIVISIONS
45CA KNOWLEDGE OF UNITS
45CB KNOWLEDGE OF PARTS
45CC KNOWLEDGE OF COMPONENTS
45CD KNOWLEDGE OF ELEMENTS
45CE KNOWLEDGE OF FACTORS
45CF KNOWLEDGE OF ASPECTS
45CG KNOWLEDGE OF FEATURES
45CH KNOWLEDGE OF QUALITIES
45CI KNOWLEDGE OF PROPERTIES
45CJ KNOWLEDGE OF CHARACTERISTICS
45CK KNOWLEDGE OF ATTRIBUTES
45CL KNOWLEDGE OF MARKS
45CM KNOWLEDGE OF SIGNS
45CN KNOWLEDGE OF SYMBOLS
45CO KNOWLEDGE OF MARKERS
45CP KNOWLEDGE OF INDICATORS
45CQ KNOWLEDGE OF SIGNALS
45CR KNOWLEDGE OF NOTICES
45CS KNOWLEDGE OF ANNOUNCEMENTS
45CT KNOWLEDGE OF ADVERTISEMENTS
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45CV KNOWLEDGE OF INFORMATION
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45EV KNOWLEDGE OF INFORMATION
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45JF KNOWLEDGE OF HOBBIES
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45JK KNOWLEDGE OF CAREERS
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45MR KNOWLEDGE OF SIGNALS
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CONTRACT NO. DAB160-81-C-0017

ATTACHMENT TO IPA-1 OF
MOS: 31V TASK NUMBER: 113-587-3074

COMMENTS

NO REFERENCE IS MADE WITHIN THIS ANALYSIS TO RESOURCE MATERIAL (IM'S, ETC) BECAUSE NONE ARE INDICATED FOR TASK 113-587-3074 IN FM 11-31V 1/2. ACCORDING TO SME, THIS IS BECAUSE THE INFORMATION AS WRITTEN FOR THIS TASK, HAS BEEN CULLED BY TECHNICAL WRITERS DIRECTLY FROM "HANDOUT" INFORMATION ORGANIZED BY SME HIMSELF-WHICH HE HAD CULLED FROM WHAT HE REFERS TO AS CONFUSING AND INACCURATE TECHNICAL MANUALS.

* TASK TITLE IN FM 11-31V 1/2 SPECIFIES "RADIO SET" (SINGULAR); BUT AN/VRC 53/64 STANDS FOR AN/VRC-53 OR AN/VRC-54. THIS ERROR STANDS CORRECTED IN THIS TASK PERFORMANCE ANALYSIS.

TASK PERFORMANCE ANALYSIS

STEP NUMBER PREREQUISITE COMPETENCIES J I D STEP STATEMENT

1.
 - 1.A. 26B 41E 06A
PERFORM INITIAL ADJUSTMENTS.
SET AMPLIFIER-POWER SUPPLY (AM-2060) POWER SWITCH TO "OFF"
BY FLIPPING SWITCH DOWNWARD.
 - 1.A.1. 29B
LOCATE SWITCH AT LOWER LEFT-HAND CORNER OF FRONT
PANEL.
 - 1.B. 41E 26B 11B
TURN RECEIVER-TRANSMITTER (RT) 505/841 FUNCTION SWITCH
TO "OFF", BY TURNING FULLY COUNTERCLOCKWISE.
 - 1.B.1. 29B
LOCATE SWITCH AT LOWER RIGHT-HAND CORNER ON FRONT PANEL.
 - 1.C. 40A
START VEHICLE ENGINE.
 - 1.C.1. 40A
INSURE RADIO SET IS TURNED OFF BEFORE STARTING
ENGINE.
2.
 - 2.A. 41C 26D
VERIFY INSTALLATION.
CHECK ALL CABLE CONNECTIONS ON AM-2060 AND ON RT.
 - 2.B. 41C
CHECK PLACEMENT OF AM-2060 ON MOUNT.
 - 2.B.1. 06A
LOOSEN MOUNT CLAMPS.
 - 2.B.1.A. 06A 11B
TURN THUMBSCREWS COUNTERCLOCKWISE.
 - 2.B.2. 06B
PUSH AM-2060 AS FAR BACK AS IT WILL GO ON MOUNT
MT-1029.
 - 2.B.2.A. 40A
INSURE MOUNT CLAMPS ENGAGE WITH AM-2060.
 - 2.B.3. 06A 11B
TIGHTEN MOUNT CLAMPS.
 - 2.C. 41C
TURN THUMBSCREWS CLOCKWISE.
 - 2.C.1. 06A
CHECK PLACEMENT OF RT ON AM-2060.
 - 2.C.1.A. 06A 11B
LOOSEN AM-2060 CLAMPS.
 - 2.C.2. 06B
TURN THUMBSCREWS COUNTERCLOCKWISE.
 - 2.C.3. 06A
PUSH RT AS FAR BACK AS IT WILL GO ON AM-2060.
 - 2.C.3.A. 06A 11B
TIGHTEN AM-2060 CLAMPS.
 - 06A 11B
TURN THUMBSCREWS CLOCKWISE.
3.
 - 3.A. 26A
PRESET CONTROLS.
PRESET AM-2060 (VEHICULAR CONFIGURATIONS ONLY).
 - 3.A.1. 06A 11B 41E
SET SPEAKER SWITCH TO "OFF", BY FLIPPING
DOWNWARD.
 - 3.A.1.A. 29B
LOCATED IMMEDIATELY ABOVE POWER SWITCH AT LOWER LEFT-HAND
CORNER.
 - 3.A.2. 41C
CHECK FREQUENCY BAND INDICATOR KNOB SETTING.
 - 3.A.2.A. 29B
LOCATE FREQUENCY BAND INDICATOR KNOB ON BOTTOM OF
MX-6707 (ANTENNA MATCHING UNIT).
 - 3.A.2.A.1. 41G
IF UTILIZING MX-2799 ANTENNA MATCHING UNIT #, PRESETTING
IS REQUIRED.
 - 3.B. 26A
PRESET RT UNIT (ALL CONFIGURATIONS).
 - 3.B.1. 06A 11B
TURN VOLUME ONLY FULLY CLOCKWISE.
 - 3.B.1.A. 29B
LOCATE CONTROL ON LOWER RIGHT-HAND SIDE. IMMEDIATELY ABOVE
FUNCTION SWITCH.
 - 3.B.2. 06A
TUNE TO A FREQUENCY OTHER THAN A NET FREQUENCY.
 - 3.B.2.A. 06A
USE MEGACYCLE (MC) AND KILOCYCLE (KC) TUNING KNOBS IAN
TASK 113 574-2061, STEPS 2.B.1-2.

TASK PERFORMANCE ANALYSIS

PREREQUISITE
COMPETENCIES

J I D STEP STATEMENT

STEP NUMBER

INSTALL AN/URM-182 (WATT METER) FOR TASK 113-574-2061,
STEP 1.

- | | |
|--------------|--|
| 5.A. | PERFORM EQUIPMENT PERFORMANCE CHECK (EPC). |
| 5.A.1. | CHECK AM-2060 POWER INPUT. |
| 5.A.1.A.1. | SET POWER SWITCH TO "ON", BY FLIPPING UPWARD. |
| 5.A.1.A.1. | LOCATE SWITCH AT LOWER LEFT-HAND CORNER ON FRONT PANEL. |
| 5.A.1.A.1. | OBSERVE WHETHER POWER SWITCH REMAINS SET TO "ON". |
| 5.A.1.A.2. | OBSERVE WHETHER RT IS TURNED OFF. |
| 5.A.1.A.2.A. | IF RT REMAINS ON, LISTEN FOR RUSHING NOISE. |
| 5.A.1.A.2.B. | IF RT IS TURNED OFF, RUSHING NOISE IS ABSENT. |
| 5.B. | CHECK MATCHING UNIT CONTROL. |
| 5.B.1. | TURN AM-2060 ANTENNA FREQUENCY CONTROL TO ANY OTHER SETTING, AND THEN TURN IT TO CORRESPOND WITH DIAL FREQUENCY SETTING. |
| 5.B.1.A. | LISTEN FOR SWITCHING SOUND FROM ANTENNA MATCHING UNIT. |
| 5.B.1.A.1. | IF UTILIZING MX-6707 ANTENNA MATCHING UNIT, INSURE FREQUENCY BAND INDICATOR KNOB SETTING (LOCATED ON BOTTOM OF ANTENNA MATCHING UNIT) CORRESPONDS WITH SETTING ON ANTENNA FREQUENCY CONTROL (LOCATED AT UPPER LEFT HAND CORNER ON FRONT PANEL OF AM-2060). |
| 5.C. | CHECK RT POWER UNIT. |
| 5.C.1. | TURN RT FUNCTION SWITCH (SPRING-LOADED) TO "LIFE" AND HOLD AT THIS POSITION. |
| 5.C.1.A. | OBSERVE WHETHER RT DIAL LAMP LIGHTS. |
| 5.C.1.A.1. | RECORD AN ABNORMAL INDICATION ON DA FORM 2404. |
| 5.D. | CHECK AUDIO OUTPUT, USING AUDIO ACCESSORY. |
| 5.D.1. | TURN RT FUNCTION SWITCH TO "ON". |
| 5.D.1.A. | LISTEN OVER AUDIO ACCESSORY FOR LOUD RUSHING NOISE. |
| 5.D.1.A.1. | RECORD AN ABNORMAL INDICATION ON DA FORM 2404. |
| 5.D.2. | TURN RT VOLUME CONTROL TO MIDPOINT (5). |
| 5.D.2.A. | TURN COUNTERCLOCKWISE. |
| 5.D.2.B. | LISTEN OVER AUDIO ACCESSORY FOR DECREASE IN LOUDNESS OF RUSHING NOISE. |
| 5.D.2.B.1. | RECORD AN ABNORMAL INDICATION ON DA FORM 2404. |
| 5.E. | CHECK AUDIO OUTPUT FROM AM-2060 SPEAKER. |
| 5.E.1. | SET SPEAKER SWITCH TO "ON", BY FLIPPING UPWARD. |
| 5.E.1.A. | LISTEN AT SPEAKER FOR RUSHING NOISE. |
| 5.E.1.A.1. | IF RUSHING NOISE IS NOT HEARD, RECORD THIS ABNORMAL INDICATION ON DA FORM 2404. |
| 5.E.1.A.2. | IF RUSHING NOISE IS HEARD, FLIP SPEAKER SWITCH DOWNWARD TO "OFF". |
| 5.F. | CHECK SQUELCH CONTROL. |
| 5.F.1. | TURN RT FUNCTION SWITCH TO "SQUELCH". |

TASK PERFORMANCE ANALYSIS

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D STEP STATEMENT
5.F.1.A. 5.F.1.A.1.	06A 11B 41G	TURN CLOCKWISE. LISTEN OVER AUDIO ACCESSORY FOR ELIMINATION OF RUSHING NOISE.
5.F.1.A.1.A. 5.F.2. 5.F.2.A. 5.F.2.A.1.	41G 32B 06A 41E 06A 11B 41G	RECORD AN ABNORMAL INDICATION ON DA FORM 2404. TURN RT FUNCTION SWITCH TO "ON". TURN COUNTERCLOCKWISE. LISTEN OVER AUDIO ACCESSORY FOR RETURN OF RUSHING NOISE.
5.F.2.A.1.A. 5.G. 5.G.1.	41G 32B 41C	RECORD AN ABNORMAL INDICATION ON DA FORM 2404. CHECK ANTENNA MATCHING UNIT CONTROL. IF UTILIZING MX-2799 ANTENNA MATCHING UNIT, FREQUENCY BAND INDICATOR KNOB SETTING NEED NOT BE SAME AS ANTENNA FREQUENCY CONTROL SETTING. 41G
5.G.2.	41G 051	IF UTILIZING MX-6707 ANTENNA MATCHING UNIT, FREQUENCY BAND INDICATOR KNOB SETTING MUST BE SAME AS ANTENNA FREQUENCY CONTROL SETTING.
5.G.2.A. 5.G.2.A.1. 5.G.2.A.1.A. 5.H. 5.H.1 5.H.1.A.	05F 41F 41G 32B 41C 051	TURN AM-2060 ANTENNA FREQUENCY CONTROL TO CORRESPOND WITH RT TEST FREQUENCY. LISTEN FOR SWITCHING SOUND FROM ANTENNA MATCHING UNIT WHEN AM-2060 ANTENNA FREQUENCY CONTROL IS TURNED. RECORD ANY ABNORMAL INDICATION ON DA FORM 2404. CHECK RECEPTION. TUNE RT TO RECEIVE TEST FREQUENCY USE MC AND KC TUNING KNOBS IAW TASK 113-574-2061, STEPS 2.8.1-2.
5.H.1.A.1. 5.H.1.A.2. 5.H.1.A.2.A. 5.H.2. 5.H.2.A. 5.H.2.A.1. 5.H.2.A.1.A. 5.I. 5.I.1. 5.I.1.A. 5.I.2. 5.I.2.A. 5.I.3. 5.I.3.A.	41F 41F 41G 32B 06A 41E 06A 11B 41F 41G 32B 41C 051 01F 06A 41E 06A 11B 41E 41F	LISTEN OVER AUDIO ACCESSORY FOR RUSHING NOISE TO QUIET. LISTEN OVER AUDIO ACCESSORY FOR A CLEAR VOICE SIGNAL. RECORD AN ABNORMAL INDICATION ON DA FORM 2404. TURN RT FUNCTION SWITCH TO "SQUELCH". TURN SWITCH CLOCKWISE. LISTEN OVER AUDIO ACCESSORY FOR A CLEAR VOICE SIGNAL. RECORD AN ABNORMAL INDICATION ON DA FORM 2404. CHECK RT KEYING. TUNE RT OFF, RECEIVE TEST FREQUENCY. USE KILOCYCLE (KC) CONTROL ONLY. TURN RT FUNCTION SWITCH TO "ON". TURN SWITCH COUNTERCLOCKWISE PRESS AND RELEASE "PUSH-TO-TALK" SWITCH SEVERAL TIMES. LISTEN FOR RT RELAYS TO CLICK AND FOR RUSHING NOISE TO BECOME QUIET, WITH "PUSH-TO-TALK" SWITCH PRESSED.
5.I.3.A.1. 5.H.3.B. 5.H.3.B.1. 5.J. 5.J.1. 5.J.1.A.	41G 32B 41F 41G 32B 41C 06A 41E 06A 11B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404. LISTEN FOR RT RELAYS TO CLICK AND FOR RETURN OF RUSHING NOISE, WITH "PUSH-TO-TALK" SWITCH RELEASED. RECORD AN ABNORMAL INDICATION ON DA FORM 2404. CHECK Muting OVER AM-2060 SPEAKER. SET AM-2060 SPEAKER SWITCH TO "ON". FLIP SWITCH UPWARD

03/16/82

TASK PERFORMANCE ANALYSIS

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D STEP STATEMENT
S J 2.		PRESS AND RELEASE "PUSH-TO-TALK" SWITCH SEVERAL TIMES
S J 2.A.	41F	IAM STEPS 5.1.3 A-B.
S J 2.A.1.	41G 32B	LISTEN OVER AUDIO ACCESSORY FOR KUSHING NOISE TO BECOME QUIETED.
S J 2.B.	06B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
S J 2.B.1.	40A 26B	HOLD MICROPHONE IN FRONT OF AM-2060 SPEAKER WHILE PRESSING AND RELEASING "PUSH-TO-TALK" SWITCH.
S J 2.B.1.A.	41G 32B	INSURE NO AUDIO FEEDBACK (SQUEAL) IS HEARD.
S K.		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
S K.1.	41C	EVALUATE RT RADIO FREQUENCY (RF) OUTPUT SYSTEM AND ANALYZE RESULTS IAW TASK 113-574-2061, STEPS 2-3.
S K.1.A.	05I	CHECK ANTENNA MATCHING UNIT CONTROL WHILE PERFORMING EVALUATION.
S K.1.A.1.	32B	CHECK ANTENNA MATCHING UNIT MX 6707 FREQUENCY BAND INDICATOR KNOB SETTING CORRESPONDS WITH EACH SETTING OF AM-2060 FREQUENCY BAND CONTROL.
S L.	05I	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
S L.1.		CHECK TRANSMIT FREQUENCY ACCURACY.
S L.1.A.		TUNE AMPLIFIER-POWER SUPPLY AM-2060 TO NET FREQUENCY OF TRANSMIT TEST STATION.
S L.2.	01F	USE ANTENNA FREQUENCY CONTROL AND SET FREQUENCY TO CORRESPOND TO FREQUENCY SHOWN ON "REC-TRANS FREQUENCY" DIAL ON RT.
S L.2.A.	26B	TUNE RT TO NET FREQUENCY OF TRANSMIT TEST STATION.
S L.3.	41G	USE MC AND KC TUNING KNOBS IAW TASK 113-574-2061, STEP 2.B.1-2.
S L.3.A.	26A	KEY RT, BY PRESSING "PUSH-TO-TALK" SWITCH.
S L.3.A.1.	41G	INITIATE RADIO CHECK BY SPEAKING INTO MICROPHONE.
S L.3.A.1.A.	32B	LISTEN FOR RESPONSE FROM NET OPERATOR.
S M.	26B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
S M.1.	41G	CHECK VOICE MODULATION AND SIDETONE.
S M.1.A.	26D	PERFORM IAW STEP 5.1.3 AND ALSO LISTEN FOR VOICE SIDETONE.
S N.		CHECK 150HZ GENERATION AND MODULATION.
S N.1.		INITIATE ANOTHER NET CONTROL STATION CALL ("NCS CALL").
S N.1.A.		ASK NCS OPERATOR TO CHANGE TO SQUELCH MODE.
S N.1.A.1.	04C	WAIT A FEW SECONDS FOR NCS OPERATOR TO COMPLY.
S N.1.A.1.A.	06A 41E	TURN TRANSMIT TEST STATION'S FUNCTION SWITCH TO "SQUELCH".
S N.2.		PERFORM IAW STEP 5.1.3, AND ALSO LISTEN FOR VOICE SIDETONE.
S N.2.A.	41F	IF TRANSMIT TEST STATION IS WITHIN AUDIO RANGE, VOICE SIDETONE SHOULD BE HEARD COMING FROM TEST STATION, AND AS "PUSH-TO-TALK" SWITCH IS RELEASED, A SHORT BURST OF RUSHING NOISE SHOULD BE HEARD.
S N.2.A.1.	41G 32B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
S O.	25C	PERFORM DISTANCE CHECK.
S O.1.	02G 37D	ESTABLISH COMMUNICATIONS WITH ANOTHER RADIO SET (OR STATION) SITUATED WITHIN PLANNING RANGE (APPROXIMATELY 3 TO 5 MILES).

TASK PERFORMANCE ANALYSIS

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D STEP STATEMENT
5.P.	41C 26A	CHECK RT SHUTDOWN.
5.P.1.	06A 41E	TURN RT FUNCTION SWITCH FIRST TO "ON", AND THEN TO "OFF".
5.P.1.A.	06A 11B	TURN FULLY COUNTERCLOCKWISE.
5.P.1.A.1.	41F	OBSERVE WHETHER RT HAS STOPPED OPERATING, BY LISTENING FOR RUSHING NOISE (WHILE IN "ON") AND THEN SILENCE (WHILE IN "OFF").
5.P.1.A.1.A.	41G 32B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.Q.	41C	CHECK AMPLIFIER-POWER SUPPLY AM-2060 SHUTDOWN.
5.Q.1.	06A 41E	SET AM-2060 POWER SWITCH TO "OFF".
5.Q.1.A.	06A 11B	FLIP SWITCH DOWNWARD.
5.Q.2.	41E 06B	TURN ANTENNA FREQUENCY CONTROL TO ANOTHER SETTING, AND THEN RETURN TO ORIGINAL SETTING.
5.Q.2.A.	41F	LISTEN AND INSURE NO SWITCHING NOISE IS HEARD COMING FROM ANTENNA MATCHING UNIT.
5.Q.2.A.1.	41G 32B	RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
6.		REPORT RESULTS.
6.A.	32D 32B	USE DA FORM 2404.
6.A.1.	32A	IF NO ABNORMAL INDICATIONS WERE RECORDED THROUGHOUT EVALUATION, ENTER "SATISFACTORY" AS LAST ENTRY ON FORM.
6.B	32A	IF ABNORMAL INDICATIONS WERE RECORDED AT ANY POINT DURING EVALUATION, ENTER "UNSATISFACTORY" AS LAST ENTRY ON FORM.
6.B	37A	GIVE DA FORM 2404 TO SUPERVISOR (END OF TASK).

Example 3: TPA-X

CONTRACT NO. DAB160-81-C-0017 DATE PRINTED:
COMPLETE EXTENDED TASK ANALYSIS PROCEDURES RESULTS 02/25/83
TPA-1

MOS: 710 JOURNALIST ANALYSIS SITE: HARR
TASK NUMBER: 214-176-1401 BSEP I
CONDUCT A NEWS/FEATURE INTERVIEW

MANUAL: FM 45-710 1/2 (OCTOBER 1979)
DATE STARTED: 250681 DATE COMPLETED: 060781 HOURS: .45
ORIGINAL ANALYSIS: 290681 VERIFICATION: 020981 INSTRUCTIONAL REVIEW: 140981

TASK SYNOPSIS
JOURNALIST PREPARES FOR AND CONDUCTS AN INTERVIEW WHICH WILL SERVE AS BASIS
FOR NEWS/FEATURE STORY.

EQUIPMENT
NOTE PAD, PENCIL, TAPE RECORDER WITH ACCESSORIES (OPTIONAL), STANDARD
REFERENCES (DICTIONARY, ENCYCLOPEDIAS, ETC)

COMMENTS ERRATA
LEVEL 1 WOULD BE UNLIKELY TO DO AN INTERVIEW IN THIS MUCH DEPTH OR WITH SO
MUCH DETAILED PLANNING/BACKGROUND RESEARCH.

- MAJOR STEPS
1. ANALYZE WHAT IS NEEDED TO FULFILL ASSIGNMENT.
 2. COMPOSE WELL-ROUNDED SET OF QUESTIONS TO ELICIT NEEDED INFORMATION.
 3. SELECT INTERVIEWEE.
 4. REFINES QUESTIONS TO FIT SELECTED INTERVIEWEE.
 5. DEAL WITH PHYSICAL ASPECTS RELATED TO PENDING INTERVIEW.
 6. CONDUCT INTERVIEW
 7. PERFORM FOLLOW-UP CHORES.

MOTOR SKILLS NOT ANALYZED

45A MULTI-LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D REACTION OPTIMIZATION
45E REACTION TIME
45F RATE CONTROL
45G FINGER DEXTERITY
45H ARM AND STEADINESS
45I WRIST FINGER SPEED

46A OPERATE EQUIPMENT - MANUALLY LIFT
46B USE HAND TOOLS - DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORCE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND SERVICES
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM

46

TASK PERFORMANCE ANALYSIS

STEP NUMBER

J I D STEP STATEMENT

1. ANALYZE WHAT IS NEEDED TO FULFILL ASSIGNMENT.
 - 1.A. < IF INTERVIEW IS IMPROPTU, I.E., CONDITIONS PRECLUDE ADVANCE PLANNING, GO TO STEP 5.
 - 1.B. < DECIDE DIRECTION/GOAL OF STORY TO BE WRITTEN.
 - 1.B.1.A. < CONSIDER CONSTRAINTS IMPOSED BY ASSIGNMENT.
 - 1.B.1.B. < CONSIDER TIME CONSTRAINTS.
 - 1.B.1.B.1. < CONSIDER LIMITS IMPLIED BY STATED TOPIC.
 - 1.B.1.B.2. < IF STATEMENT SEEMS VAGUE, SEEK CLARIFICATION FROM ASSIGNER. MATERIAL, AND CHOICE OF POTENTIAL INTERVIEWEES.
2. < ANALYZE IMPLIED LIMITS ON SUBJECT MATTER, TREATMENT OF MATERIAL, AND CHOICE OF POTENTIAL INTERVIEWEES.
 - 1.B.1.C. < CONSIDER ALLOTTED SPACE LIMITS FOR FINISHED STORY.
 - 1.B.2. < CONSIDER CONSTRAINTS IMPOSED BY WORKING CONDITIONS.
 - 1.B.3. < CONSIDER PERSONAL KNOWLEDGE OF TOPIC AND POTENTIAL INTERVIEWEES.
 - 1.B.4. < CONSIDER POSSIBLE APPROACHES TO STORY.
 - 1.B.4.A. < GENERATE APPROACHES TO STORY.
 - 1.B.4.B. < EVALUATE APPROACHES GENERATED.
 - 1.B.5. < SELECT APPROACH.
3. < RESEARCH ASSIGNMENT.
 - 1.C.1. < RESEARCH STANDARD REFERENCES (DICTIONARIES, ALMANACS, THESAURUS, ETC.) FOR RELEVANT INFORMATION.
 - 1.C.1.A. < IDENTIFY KEY WORDS/PHRASES IN STATED TOPIC.
 - 1.C.1.B. < IDENTIFY RELATED WORDS/PHRASES.
 - 1.C.1.C. < USE IDENTIFIED WORDS/PHRASES TO ACCESS RELEVANT INFORMATION IN STANDARD REFERENCES.
 - 1.C.1.D. < READ MATERIALS LOCATED.
 - 1.C.1.E. < TAKE NOTES OF USEFUL INFORMATION.
 - 1.C.1.F. < ANNOTATE NOTES TO ALLOW READY REFERENCE TO SOURCE.
 - 1.C.2. < SEARCH OFFICE MORGUE/LIBRARY FOR RELATED MATERIAL (SEE TASK 214-176-1419).
4. < READ MATERIALS.
 - 1.C.2.A. < TAKE NOTES OF USEFUL INFORMATION.
 - 1.C.2.B. < ANNOTATE NOTES FOR READY REFERENCE TO SOURCE.
 - 1.C.2.C. < REVIEW MATERIAL GATHERED.
 - 1.C.3. < ORGANIZE MATERIAL.
 - 1.C.3.A. < LIST FROM DATA ALREADY COLLECTED ADDITIONAL LIKELY INFORMATION SOURCES.
 - 1.C.3.B. < EXPLORE ADDITIONAL SOURCES IAW STEP 1.C.2.
5. < IF SUFFICIENT BACKGROUND MATERIAL HAS NOT BEEN FOUND, GO BACK TO STEP 1.C. AND INVESTIGATE LEADS OVERLOOKED EARLIER.
6. < IF SUFFICIENT BACKGROUND MATERIAL HAS NOT BEEN FOUND AND AVAILABLE TIME OR INGENUITY HAVE BEEN EXHAUSTED, GO TO STEP 2.

2. COMPOSE WELL-ROUNDED SET OF QUESTIONS.
2.A. COMPOSE QUESTIONS OF VARIOUS TYPES.

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

- 2 B. REVIEW QUESTIONS TO ASSURE THAT ALL IMPORTANT, ANTICIPATED ASPECTS OF TOPIC HAVE BEEN CONSIDERED.
- 2 B.1. EXAMINE/READ AT ONE SITTING QUESTIONS ALREADY PREPARED.
- 2 B.2. ASK SELF: "WHAT HAVE I LEFT OUT?"
- 2 C. COMPOSE QUESTIONS IAW STEP 2.A, TO COVER DETECTED GAPS.
- 3. < S/FLECT INTERVIEWEE.
- 3.A. < DETERMINE NUMBER OF INTERVIEWEES NEEDED/DESIRED.
- 3.A.1. < REVIEW ASSIGNMENT CONSTRAINTS (STEP 1.B) IN LIGHT OF INFORMATION ACQUIRED BY BACKGROUND RESEARCH (STEP 1.C).
- 3.A.2. < MAKE TENTATIVE DECISION OF NUMBER NEEDED/DESIRED.
- 3.B. < LIST POTENTIAL INTERVIEWEES.
- 3.C. < ASSIGN ORDER OF PREFERENCE/DESIRABILITY TO POTENTIAL INTERVIEWEES.
- 3.C.1. < CONSIDER EACH, APPLYING CRITERIA SUCH AS NEWSWORTHINESS, EXPERTISE, AUTHORITY, AVAILABILITY, PROXIMITY, WILLINGNESS, TIME CONSTRAINTS, EXPECTED YIELD IN RELATION TO CONTACT TIME REQUIRED.
- 3.C.2. < ORDER GROUPS/INDIVIDUALS ACCORDING TO PERCEIVED FIT TO STEP 3.C.1 CRITERIA.
- 3.D. < MAKE TENTATIVE SELECTION OF INTERVIEWEE(S).
- 3.E. < PROBE ACQUAINTANCES/COLLEAGUES OF SELECTEE(S) INFORMALLY FOR ADDITIONAL BACKGROUND.
- 3.E.1. < INFORM CONTACT OF OWN IDENTITY, AFFILIATION, AND PURPOSE OF CONTACT.
- 3.E.2. < ASSURE PERSON NO QUOTES/ATTRIBUTIONS FROM CONVERSATION WILL APPEAR IN STORY WITHOUT EXPRESS PERMISSION.
- 3.E.3. < ASSURE PERSON OF STRICT CONFIDENTIALITY, UNLESS EXPRESS PERMISSION IS GIVEN.
- 3.E.4. < ASK "RANDOM" QUESTIONS ABOUT POTENTIAL INTERVIEWEE.
- 3.F. < USE RESULTS OF PROBING TO REVISE PREFERENCE/ORDER OF POTENTIAL INTERVIEWEES.
- 3.G. < SELECT INTERVIEWEE(S).
- 4. < REFINE QUESTIONS TO FIT SELECTED INDIVIDUAL(S).
- 4.A. < PREPARE LIST OF QUESTIONS WHICH SELECTED INTERVIEWEE CAN PROBABLY ANSWER WITH FIRST-HAND KNOWLEDGE OR INFORMED OPINION.
- 4.A.1. < SELECT APPROPRIATE QUESTIONS FROM INITIAL LIST (STEP 2).
- 4.A.2. < COMPOSE ADDITIONAL QUESTIONS AS/IF NEEDED ON BASIS OF UNIQUE CHARACTERISTICS OF INTERVIEWEE UNCOVERED BY BACKGROUND RESEARCH.
- 4.A.3. < REPHRASE QUESTIONS THAT ARE "ALMOST RIGHT".
- 4.A.4. < REVISE LIST AND NEWLY PREPARED QUESTIONS IAW STEP 2.
- 4.B. < ARRANGE QUESTIONS IN TENTATIVE SEQUENCE OF EXPECTED USE.
- 4.B.1. < SELECT EASILY ANSWERED QUESTION TO USE AS OPENER.
- 4.B.2. < ARRANGE OTHER QUESTIONS IN SEQUENCE WHICH SEEMS TO PROMISE ORDERLY PROGRESSION THRU TOPIC.

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

4. B. 3. INTERNALIZE THE QUESTIONS.

5. DEAL WITH PHYSICAL ASPECTS OF PENDING INTERVIEW.
5. A. MAKE APPOINTMENT WITH INTERVIEWEE IF CIRCUMSTANCES (I.E., IMPROPTU STORY) DO NOT PRECLUDE.

5. A. 1. CONTACT INTERVIEWEE COURTEOUSLY.

5. A. 1. A. IDENTIFY SELF, OFFICE/PUBLICATION, AND PURPOSE.

5. A. 1. B. STATE BRIEFLY ASSIGNED TOPIC AND REASON FOR SELECTION OF INTERVIEWEE AND HIS OPTIONS IN REGARD TO INTERVIEW PROCEDURES (PHOTOGRAPHY, OFF-THE-RECORD INFORMATION, PERMISSION FOR QUOTATIONS, ETC)

5. A. 1. C. GIVE BEST ESTIMATE OF TIME NEEDED FOR INTERVIEW.

5. A. 2. IF INTERVIEWEE IS AVAILABLE FOR FACE TO FACE MEETING,

5. A. 3. SCHEDULE A MUTUALLY AGREEABLE TIME/LOCATION.

5. A. 3. A. IF SELECTED INTERVIEWEE DECLINES, ASK IF INTERVIEWEE WOULD PREFER STORY BE WRITTEN WITHOUT BENEFIT OF HIS PERSPECTIVE.

5. A. 3. B. IF INTERVIEWEE RELENTS, GO BACK TO STEP 5. A. 2.

5. B. IF HE STILL DECLINES, GO BACK TO STEP 3. D.

ASSEMBLE NOTES, PAD(S), PENS/PENCILS, AND ANY OTHER MATERIALS NEEDED FOR INTERVIEW.

5. C. DETERMINE IF ASSIGNMENT WOULD BE ENHANCED BY/REQUIRES PHOTOGRAPHS.

5. C. 1. IF NO, GO TO STEP 5. D.

5. C. 2. IF YES, MAKE NEEDED ARRANGEMENTS.

5. C. 2. A. IF TAKING OWN PHOTOGRAPHS, CHECK CAMERA, FILM, AND FLASH TO ASSURE ADEQUACY/FUNCTIONING.

5. C. 2. B. IF NOT TAKING OWN PHOTOGRAPHS, REQUEST SUPERVISOR TO ASSIGN A PHOTOGRAPHER.

5. D. IF INTERVIEW IS NOT CONVENIENT FOR WALKING, MAKE TRANSPORTATION ARRANGEMENTS.

5. D. 1. IF USING MOTOR POOL VEHICLE, DO NEEDED SCHEDULING/PAPERWORK.

5. D. 2. IF USING PUBLIC TRANSPORT, MAKE NEEDED PREPARATION (SCHEDULING, RESERVATIONS, TICKET PURCHASE, ETC).

5. E. ATTEND TO PERSONAL APPEARANCE.

5. E. 1. GROOM SELF IAW MILITARY STANDARDS OF CLEANLINESS (HAIR LENGTH/STYLE, FACIAL HAIR, AND OVERALL APPEARANCE).

5. E. 2. DON CLOTHING/UNIFORM APPROPRIATE TO THE OCCASION AND IAW MILITARY STANDARDS.

5. F. TRAVEL TO INTERVIEW SITE, ARRIVING SHORTLY BEFORE SCHEDULED TIME.

6. CONDUCT INTERVIEW

6. A. CONDUCT INTRODUCTORY DIALOGUE.

6. A. 1. INTRODUCE SELF BRIEFLY.

6. A. 2. THANK INTERVIEWEE FOR GRANTING TIME.

6. A. 3. RESTATE BRIEFLY PARAMETERS OF ASSIGNMENT AND RESTATE THE INTERVIEW PROCEDURES DISCUSSED EARLIER.

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

- 5 A 1 RESPOND TO QUESTIONS AND COMMENTS.
- 5 A 2 IF INTERVIEWEE BEGINS TO DIRECT INTERVIEW, REASSERT CONTROL.
- 5 A 3 A. INTERRUPT POLITELY.
- 5 A 3 B. RESTATE FOCUS/PURPOSE OF INTERVIEW, AND/OR.
- 5 A 3 C. ASK QUESTION THAT LEADS BACK TO TOPIC.
- 5 A 4 OPEN TOPIC BY ASKING LEAD-IN QUESTION.
- 5 B 1 ASSESS INTERVIEWEE'S RESPONSE STYLE.
- 5 C 1 WATCH FOR CUES TO INDIVIDUAL'S TYPICAL WAY OF REACTING TO QUESTIONS.
- 5 C 2 CATEGORIZE INTERVIEWEE INFORMALLY INTO A PERSONALLY USEFUL/MEANINGFUL "TYPE".
- 5 D 1 MATCH QUESTIONING STRATEGY TO RESPONSE STYLE OF RESPONDENT.
- 5 E 1 QUESTION INTERVIEWEE.
- 5 E 1.1 IF LEAD-IN QUESTION DOES NOT PRODUCE A CHAIN OF USEFUL COMMENTS/OPPORTUNITIES FOR FOLLOW-UP QUESTIONS, USE QUESTIONS PREPARED EARLIER TO INITIATE/GUIDE INTERVIEW.
- 5 E 2 GENERATE NEW QUESTIONS TO HANDLE CONTINGENCIES.
- 5 E 2.1 IF INTERVIEWEE DIGRESSES UNPRODUCTIVELY, REFOCUS ON TOPIC.
- 5 E 2.2 IF LEADING QUESTIONS SEEM NECESSARY, USE SPARINGLY AND CAREFULLY.
- 5 E 2.3 FOLLOW UP CUES TO UNANTICIPATED AREAS OF RELEVANCE/INTEREST/KNOWLEDGE.
- 5 E 2.4 MOVE AWAY FROM AREA/ASPECT IN WHICH INTERVIEWEE LACKS COMPETENT/PERTINENT INFORMATION.
- 5 E 2.5 ASK REPHRASED QUESTIONS TO ELICIT CLARIFICATION WHEN RESPONSES SEEM UNCLEAR/CONTRADICTORY/CONFUSING.
- 5 E 2.6 RESTORE Waning INTEREST.
- 5 E 2.7 QUESTION RESPONSIVELY.
- 5 E 3 RELATE NEXT QUESTION TO PRECEDING RESPONSE.
- 5 E 3.1 RELATE NEW LINE(S) OF QUESTIONING TO INFORMATION GIVEN IN EARLIER RESPONSES.
- 5 E 3.2 LISTEN ATTENTIVELY TO RESPONSE BEFORE DECIDING NEXT QUESTION TO ASK.
- 5 E 3.3 RESPOND CONSIDERATELY TO INTERVIEWEE AT ALL TIMES.
- 5 F 1 ALLOW "SUFFICIENT" TIME FOR THOUGHTFUL RESPONSE IN MOST CIRCUMSTANCES.
- 5 F 2 SPEAK IN NORMAL TONE.
- 5 F 3 LISTEN ACTIVELY AND INTENTLY.
- 5 F 4 AVOID "ANNOYING" BEHAVIORS.
- 5 F 5 RECORD RESPONSES AS COMPLETELY AS NEEDED FOR LATER RECALL.
- 5 F 5.1 WRITE KEY WORDS/PHRASES.
- 5 F 5.2 WRITE QUOTABLE MATERIAL IN FULL.
- 5 F 5.3 READ QUOTATIONS TO INTERVIEWEE TO VERIFY ACCURACY OF NOTES.
- 5 F 5.4 ASK INTERVIEWEE FOR PERMISSION TO BE QUOTED.
- 5 F 5.5 ENCOURAGE INTERVIEWEE WITH NONVERBAL AFFIRMATIVE CUES AND/OR BRIEF VERBAL COMMENTS.
- 5 F 6 MAINTAIN EYE CONTACT AS MUCH AS POSSIBLE.
- 5 F 7

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

- 6 F 8 REASSURE CONTINUALLY THAT PRIMARY CONCERN IS GETTING THE STORY STRAIGHT.
- 6 G RESPOND CONSTRUCTIVELY TO DISCONCERTING CONTINGENCIES.
- 6 G 1 IF INTERVIEW CAN BE CONTINUED, ADAPT INTERVIEWING STYLE.
- 6 G 1 A 1 IF NECESSARY, SPEAK A LITTLE LOUDER AND.
- 6 G 1 A 2 ASK NEW, REFOCUSING QUESTION OR.
- 6 G 1 A 3 SUMMARIZE RESPONSE GIVEN JUST BEFORE DISTRACTION OCCURRED.
- 6 G 1 B IF INTERVIEW CANNOT BE CONTINUED, SCHEDULE NEW DATE/TIME TO RESUME.
- 6 G 2 IF INTERVIEWEE'S REACTIONS INDICATE INTERVIEW IS CONTINUING TOO LONG, RESPOND TO CIRCUMSTANCES.
- 6 G 2 A 1 IF REMAINING QUESTIONS CAN BE COVERED QUICKLY, CONTINUE.
- 6 G 2 A 2 ASSURE THAT INTERVIEW WILL SOON BE TERMINATED, AND.
- 6 G 2 B INCREASE PACE.
- 6 G 2 C IF REMAINING QUESTIONS CANNOT BE COVERED QUICKLY, SCHEDULE NEW DATE/TIME TO COMPLETE INTERVIEW FACE TO FACE OR BY TELEPHONE.
- 6 G 3 IF INTERVIEWEE WISHES TO SEE STORY BEFORE PUBLICATION, ADAPT TO CIRCUMSTANCES.
- 6 G 3 A IF STORY IS POTENTIALLY SENSITIVE IN NATURE OR CONTAINS COMPLEX/TECHNICAL MATERIAL, AGREE WITH REQUEST BEING SURE TO REPORT IT TO OWN SUPERVISOR.
- 6 G 3 B IF ALLOWING STORY REVIEW IS NOT PRECLUDED BY PUBLICATION POLICY, STORY DEADLINE, OR NON-AVAILABILITY OF INTERVIEWEE, AGREE TO PERMIT REVIEW FOR FACTUAL ACCURACY ONLY.
- 6 G 3 B 1 OFFER TO READ STORY OVER TELEPHONE.
- 6 G 3 B 2 IF INTERVIEWEE OBJECTS AND HAS AUTHORITY TO INSIST ON SEEING A COPY, AGREE TO PROVIDE.
- 6 G 3 B 3 ASSURE INTERVIEWEE THAT MISUNDERSTOOD/MISSTATED FACTS POINTED OUT BY INTERVIEWEE WILL BE CORRECTED.
- 6 G 3 C IF ALLOWING STORY REVIEW IS PRECLUDED, EXPLAIN COURTEOUSLY WHY REQUEST MUST BE DENIED.
- 6 G 3 D ASSURE INTERVIEWEE AGAIN OF INTENT TO BE OBJECTIVE AND FAIR.
- 6 H CLOSE INTERVIEW
- 6 H 1 REVIEW NOTES QUICKLY TO DISCOVER GAPS IN INFORMATION OR ITEMS NEEDING FURTHER EXPLANATION.
- 6 H 2 ASK ADDITIONAL QUESTION'S AS NEEDED.
- 6 H 3 SUMMARIZE MAIN POINTS COVERED AND ITEMS OF SIGNIFICANCE.
- 6 H 4 REQUEST PERMISSION TO MAKE FOLLOW UP PHONE CALL FOR ADDITIONAL INFORMATION/VERIFICATION.
- 6 H 4 A GIVE REASON
- 6 H 4 B GIVE APPROXIMATION OF HOW SOON CALL WILL BE MADE.
- 6 H 5 THANK INTERVIEWEE FOR TIME AND COOPERATION.
- 6 H 6 DEPART.

PERFORM FOLLOW UP CHECKS.

TASK PERFORMANCE ANALYSIS

STEP NUMBER J I D STEP STATEMENT

7 A PROCESS NOTES AS SOON AS POSSIBLE AFTER INTERVIEW.
7 A 1 TRANSCRIBE NOTES INTO COMPLETE SENTENCES.
7 A 2 WRITE UP DETAILS/IMPRESSIONS WHICH SEEM RELEVANT TO STORY.
7 B MAKE DECISIONS ABOUT FURTHER ACTION.
7 B 1 IF ADDITIONAL INFORMATION IS NEEDED FROM ORIGINAL INTERVIEWEE
7 B 2 ASK FOR IT DURING FOLLOW-UP CALL (REFER TO STEP 6.H.4).
7 B 3 IF SOME OTHER INFORMANT WILL BE A BETTER SOURCE FROM
PERSPECTIVE OF NEWSWORTHINESS/QUALITY OF INFORMATION, GO BACK
TO STEP 3.G.
7 B 4 IF INFORMATION IS SUFFICIENT, EXIT TO TASK 214-176-1402
(WRITE A STRAIGHT NEWS STORY) OR TASK 214-176-1404 (WRITE A
FEATURE STORY)(END OF TASK).

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MOS: 71Q TASK NUMBER: 216 1/6-1401

IPA 3

PAGE 1

CATEGORY STEP NUMBER

IR

STATEMENT

- 26 1.C.1.A.
IDENTIFY KEY WORDS/PHRASES
- 27 1.C.1.B.
ACCESS RELEVANT INFORMATION IN STANDARD SOURCES BY USE OF KEY WORDS/PHRASES
- 28 1.C.1.D.
READ REFERENCE MATERIALS AND SOURCE MATERIALS FOR INFORMATION ABOUT TOPIC
- 36 1.C.1.E.
TAKE NOTES
- 36 1.C.2.B.
TAKE NOTES
- 36 1.C.1.F.
ANNOTATE NOTES WITH INFORMATION NEEDED TO LOCATE SOURCE
- 27 1.C.2.C.
ANNOTATE NOTES WITH INFORMATION NEEDED TO LOCATE SOURCE
- 25 1.C.3.A.
ARRANGE INFORMATION INTO USEFUL FORMAT
- 36 2.A.
WRITE QUESTIONS
- 36 4.A.2.3.
WRITE QUESTIONS
- 47 5.A.1.
DIAL TELEPHONE
- 48 5.A.1.B.
GIVE ORAL SUMMARY OF INFORMATION
- 41 5.B.
RECOGNIZE MATERIAL NEEDED FOR USE IN INTERVIEW
- 41 5.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY
- 46 6.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY
- 46 6.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY

CONTRACT NO. DABT60 81 C-0017

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TPA 3

PAGE 2

CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

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TPA-X

PAGE 1

STEP NUMBER PRINCIPLE STATEMENT

1.B. CONSTRAINTS
VIEW BOUNDARIES IMPLIED BY ASSIGNMENT/WORKING CONDITIONS AS SOMEWHAT FLEXIBLE,
I.E., DO NOT PERMIT SUCH BOUNDARIES/LIMITS TO SQUELCH PURSUIT OF PROMISING LEADS.

1.B. CONSTRAINTS (TIME)
BUDGET TIME FOR EACH PART OF TASK IAW ITS IMPORTANCE & DIFFICULTY. ANTICIPATE
VARIATION IN IMPORTANCE/DIFFICULTY OF PARTS FROM ASSIGNMENT TO ASSIGNMENT.
BUDGET TIME IAW WITH OWN WORKING STYLE/ABILITIES.

1.B. CONSTRAINTS (TOPIC)
VIEW STATED TOPIC AS A FRAME ROUGHLY IMPLYING AREA(S) APPROPRIATE FOR
EXPLORATION. PROBE STATED TOPIC & OWN EXPERIENCE FOR IMPLICATIONS WITH REGARD
TO APPROPRIATE INTERVIEWEES/INFORMATION SOURCES.

1.B. CONSTRAINTS (SPACE ALLOTTED)
VIEW INDICATED SPACE ALLOTMENT AS GUIDE TO STORY LENGTH/DEPTH OF RESEARCH &
INTERVIEW. VIEW INDICATED ALLOTMENT AS FLEXIBLE IF RESULTING STORY JUSTIFIES BY
ITS NEWSWORTHINESS OR LACK THEREOF AN INCREASE/REDUCTIONS

1.B. CONSTRAINTS (WORKING CONDITIONS)
ASSESS OWN FREEDOM OF OPERATION, I.E., IN DEVIATING FROM STATED TOPIC
CONSTRAINTS, IN LIGHT OF WORKING RELATIONSHIPS WITH SUPERVISOR & COLLEAGUES.

1.B. PERSONAL KNOWLEDGE
USE OWN KNOWLEDGE, WHATEVER IT MAY BE, AS STARTING POINT FOR PREPARING FOR THE
INTERVIEW.

1.B. GENERATE APPROACHES
USE WHATEVER TECHNIQUES YOU HAVE FOR STIMULATING A VARIETY OF POSSIBILITIES. IF
FAMILIAR WITH, USE SUCH TECHNIQUES AS FREE ASSOCIATION, IDEA NETWORKING, BRAIN-
STORMING, ASK KNOWLEDGEABLE PEOPLE, FOR IDEAS USE ANY METHODS, SERENDIPITOUS OR
1.B. GENERATE APPROACHES
(CONT.) OTHERWISE, OF INVENTION WHICH SEEM PRODUCTIVE.

1.B. EVALUATE APPROACHES
MATCH APPROACH IDEAS GENERATED AGAINST CONSIDERATIONS IN STEPS 1.B.1.2-3.

1.B. SELECT APPROACHES
USE OWN JUDGEMENT OF "BEST FIT". SELECT APPROACH THAT IS COMPATIBLE WITH OWN
INTERESTS, STYLE, & PREFERENCES.

CONTRACT NO. DABT60-81-C-0017

DATE PRINTED:

03/04/83

MOS: 710 TASK NUMBER: 214 176-1401

TPA-X

STEP NUMBER PRINCIPLE

PAGE 2

STATEMENT

- 1.C. NOTES-USEFUL DATA
SELECT INFORMATION TO RECORD ON BASIS OF ITS APPARENT RELEVANCE TO TOPIC.
POTENTIAL INTERVIEWEES, &/OR OWN KNOWLEDGE & INTERESTS. SELECT INFORMATION TO
RECORD ON BASIS OF ITS POWER TO EVOKE A CHAIN OF USEFUL/RELEVANT ASSOCIATIONS.
- 1.C. ORGANIZE MATERIAL
CATEGORIZE GATHERED MATERIAL IN SOME PERSONALLY USEFUL/MEANINGFUL WAY, SUCH AS
BUT NOT PRESCRIBED OR LIMITED TO. CHRONOLOGICALLY, TOPICALLY, HIERARCHICALLY.
SET UP CATEGORIES THAT MAKE SENSE SELF, I.E., THAT SEEM TO MAKE THE TOPIC
- 1.C. ORGANIZE MATERIAL
(CONT.) UNDERSTANDABLE. ARRANGE MATERIAL IN AN ORDER/FORMAT TO MAKE IT READILY
ACCESSIBLE TO RECALL/RETRIEVABLE.
- 1.C. SUFFICIENT MATERIAL
DECIDE SUFFICIENCY ON BASIS OF OWN SENSE OF COMPREHENSION/INCOMPREHENSION OF
GENERAL AREA OF FOCUS.
- 1.C. AVAILABLE TIME/INGENUITY
ESTIMATE/GUESS AT THE TRADE-OFF TO BE MADE BETWEEN TIME REMAINING & DIFFICULTY/
TIME EXPENDITURE REQUIRED TO FIND & EXPLORE ADDITIONAL RESOURCES. ABANDON
SEARCH AT POINT AT WHICH BEING LESS WELL-PREPARED THAN ONE WISHES IS
- 1.C. AVAILABLE TIME/INGENUITY
(CONT.) PERCEIVED AS LESS COSILY THAN DELAYING OTHER ASPECTS OF TASK.
- 2.A. COMPOSE QUESTIONS
DESIGN QUESTIONS TO ELICIT WHO, WHAT, WHERE, WHEN, WHY, & HOW ABOUT SITUATION/
EVENT/TOPIC. DESIGN QUESTIONS TO VERIFY INFORMATION ALREADY GATHERED. DESIGN
QUESTIONS TO ELICIT OPINIONS/FEELINGS WHICH WILL OFTEN BE QUOTABLE MATERIAL
- 2.A. COMPOSE QUESTIONS
(CONT.) ADDING "COLOR" TO RESULTING STORY. USE OWN HUMAN RELATIONS EXPERIENCES
AS GUIDE TO MEANS OF ELICITING OPINIONS/FEELINGS. COMPOSE QUESTIONS THAT
CHALLENGE, THREATEN, STRONGLY ENCOURAGE, SUBTLY FLATTER, &/OR EVOKE EMOTIONAL
- 2.A. COMPOSE QUESTIONS
(CONT.) ASSOCIATIONS. AVOID QUESTIONS THAT WILL BIAS RESULTING STORY. AVOID
"LEADING" QUESTIONS UNDER MOST CIRCUMSTANCES. AVOID "CLOSED" QUESTIONS, I.E.,
QUESTIONS NEEDING ONLY YES/NO ANSWERS. AVOID QUESTIONS NOT PERTINENT TO DESIRED
- 2.A. COMPOSE QUESTIONS
(CONT.) STORY. IF A DEFINITE YES/NO IS SOUGHT WITH RESPECT TO CERTAIN
INFORMATION, PHRASE QUESTION TO ELICIT THE REASON FOR THE RESPONSE (EITHER)
INCORPORATE THE "REASON FOR" CUE IN BASIC QUESTION (OR) ASK A 2-PART QUESTION.

CONTRACT NO. DAB160-81 C 0017

DATE PRINTED:
03/04/83

MOS: 710 TASK NUMBER: 214 176-1401

TPA-X

STEP NUMBER PRINCIPLE

STATEMENT

PAGE 3

2.B. GAPS IN QUESTIONS
USE OWN COMPREHENSION OF THE TOPIC AS A WHOLE & ITS PARTS TO DETERMINE WHETHER
QUESTIONS DEAL ADEQUATELY WITH ALL IMPORTANT ASPECTS.

3.A. NUMBER OF INTERVIEWEES
ESTIMATE NUMBER NEEDED/DESIRED ON BASIS OF TYPE OF TOPIC, DEPTH OF COVERAGE
DESIRED, &/OR AVAILABILITY OF QUALIFIED INFORMANTS (E.G. A MAN-IN-THE-STREET
STORY OR AN OPINION SURVEY WILL REQUIRE SEVERAL INFORMANTS, A TECHNICAL ARTICLE
3.A. NUMBER OF INTERVIEWEES
(CONT.) THOUGH TREATED IN DEPTH, MAY HAVE TO BE BASED ON THE ONLY QUALIFIED
INDIVIDUAL WHO IS AVAILABLE).

3.B. LIST POTENTIALS
DRAW ON NAMES/DATA DISCOVERED DURING BACKGROUND RESEARCH.

3.C. ORDER POTENTIALS
EVALUATE INFORMALLY ON BASIS OF BACKGROUND INFORMATION RELATIVE NEWSWORTHINESS/
EXPERTISE ETC OF THE INDIVIDUALS ON THE LIST. RECOGNIZE THAT ESTIMATES OF
NEWSWORTHINESS & EXPERTISE ARE OFTEN INTUITIVE & IMPRECISE. MAKE DECISION QUICKLY
3.C. ORDER POTENTIALS
(CONT.) WITHOUT BELABORING OR LINGERING OVER CHOICES WHERE UNCERTAINTIES PREVAIL

3.E. PROBING
SPEC TO ELICIT RESPONSES REVEALING TENTATIVE INTERVIEWEE'S PERSONALITY/
CHARACTER, E.G., HOW HE REACTS TO STRESS, HIS PERSONAL INTERESTS/LIKES/DISLIKES,
HIS HOBBIES, PROFESSIONAL EXPERIENCE NOT ACCESSIBLE IN PUBLIC SOURCES, ETC.
3.E. PROBING
(CONT.) ATTEMPT TO ELICIT NAMES OF OTHER CONTACTS WORTH PROBING, E.G. FRIENDS/
ENEMIES OF TENTATIVE INTERVIEWEE, OTHER AUTHORITIES/OPINION-MAKERS, COLLEAGUES
FROM EARLIER PERIODS, ETC.

3.E. "RANDOM" QUESTIONS
ASK PROVOCATIVE QUESTIONS ABOUT TENTATIVE INTERVIEWEE, SUCH AS, HOW DOES HE ACT
WHEN HE'S ANGRY, WHAT KINDS OF THINGS TURN HIM ON/OFF, HAVE YOU EVER SEEN HIM
WHEN HE WAS EMBARRASSED (WHAT DID HE DO) FOLLOW LEAD/INCLINATION OF INFORMANT.

3.E. "RANDOM" QUESTIONS
(CONT.) SO LONG AS THE INFORMATION SEEMS RELEVANT (OR) TO BE LEADING INTO
SOMETHING RELEVANT.

CONTRACT NO. DABT60 81-C-0017
DATE PRINTED:
05/04/83
MOS: /IQ TASK NUMBER: 216-176-1401
IPA-X
PAGE 4

STEP NUMBER PRINCIPLE STATEMENT

4. A. REFINING LIST OF QUESTIONS.
SELECT QUESTIONS IN LIGHT OF BACKGROUND & PROBING. WRITE NEW QUESTIONS TO FIT PERSONALITY OF INTERVIEWEE. REPHRASE "ALMOST RIGHT" QUESTIONS SO THAT WORDING "FITS" INTERVIEWEE'S PERSONALITY BETTER.
4. B. OPENING QUESTION
CHOOSE OPENING "EASY" QUESTION THAT, WHILE READILY DEALT WITH, IS NOT SO EASY OR GENERAL AS TO IMPLY A LACK OF SERIOUSNESS OR PREPARATION. CHOOSE "EASY" QUESTIONS THAT, AT THE SAME TIME, SIGNALS OWN KNOWLEDGEABILITY, I.E., THAT
4. B. OPENING QUESTION
(CONT.) HOMEWORK HAS BEEN DONE.
4. B. SEQUENCING QUESTIONS
ARRANGE QUESTIONS IN SEQUENTIAL ORDER WHICH "FEELS RIGHT" WHICH MAY BE LOGICAL/ TOPICAL/PSYCHOLOGICAL OR SOME OTHER PROGRESSION. DO NOT FEEL OBLIGATED TO ADHERE TO ANTICIPATED SEQUENCE IN THE INTERVIEW ITSELF.
4. B. DON'T MEMORIZE
INTERNALIZE SUBSTANCE OF QUESTIONS. CONCENTRATE IN THE ACTUAL INTERVIEW ON THE INTERVIEWEE RATHER THAN ON SELF/PREPARATION.
5. A. FEASIBILITY OF PHONE INTERVIEW.
DECIDE ON BASIS OF OWN UNDERSTANDING OF TOPIC & EXPERIENCE WITH INTERVIEWING WHETHER TOPIC IS TOO TECHNICAL OR QUESTIONS TOO MANY TO HANDLE BY TELEPHONE.
5. E. DRESS
IF WEARING UNIFORM, SELECT UNIFORM TO CONFORM WITH UNIFORM OF THE DAY/LOCAL SOP/ SITUATIONAL CONSIDERATIONS, IF SITUATION IS IDIOSYNCRATIC, SELECT UNIFORM MOST LIKELY TO PUT SELF ON COMMON GROUND WITH INTERVIEWEE. IF WEARING CIVILIAN ATTIRE,
5. E. DRESS
(CONT.) SELECT CLOTHING IAW OWN UNDERSTANDING OF WHAT IS APPROPRIATE FOR ONE APPEARING IN PUBLIC AS A REPRESENTATIVE OF THE U.S. ARMY. BASE SELECTION ON EXPECTATIONS EXPRESSED IN ARMY INDOCTRINATION & BY SUPERIORS & BASE SELECTION ON
5. E. DRESS
(CONT.) OWN SENSE OF GOOD TASTE/PROPRIETY.
6. A. INTRODUCTORY DIALOGUE
REASSURE INTERVIEWEE OF OWN PROFESSIONALISM/COMPETENCE BY APPEARING BEFORE HIM WELL PREPARED.

CONTRACT NO. DAB160-81-C-0017

DATE PRINTED:
03/04/83

MOS: 710 TASK NUMBER: 214-176-1401

TPA-X

PAGE 5

STEP NUMBER	PRINCIPLE	STATEMENT
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6.A.	RESPOND TO QUESTIONS RESPOND OPENLY TO COMMUNICATE THAT NO "HIDDEN AGENDA" EXISTS, RESPOND SUCCESSFULLY TO DISCOURAGE UNDESIRE DIGRESSIONS. RESPOND COURTEOUSLY & POSITIVELY TO BUILD RAPPORT. SHAPE RESPONSE IN SUCH A WAY AS TO MAINTAIN/REGAIN CONTROL OF DIRECTION	
6.A.	RESPOND TO QUESTIONS (CONT.) OF INTERVIEW	

6.C.	WATCH FOR CUES NOTICE DURING INTRODUCTORY DIALOGUE WHAT THE INTERVIEWEE DOES WITH THE INTERACTION & HOW FULLY HE ENGAGES IN MAINTAINING THE FLOW. ENCOURAGE INTERVIEWEE TO MAKE COMMENTS/ASK QUESTIONS IN ORDER TO SIZE UP	
6.C.	WATCH FOR CUES (CONT.) HOW LOQUACIOUS & ASSERTIVE HE MAY BE. LOOK FOR CONSISTENCIES/REPETITIONS IN HIS RESPONSE/REACTIONS.	

6.C.	CATEGORIZE "TYPE" OF RESPONSE STYLE. SELECT A FEW (THREE OR FOUR) CATEGORIES WHICH SEEM TO OFFER A MEANINGFUL/USEFUL WAY OF VIEWING THE INTERVIEWEE AS A "TYPE" SUCH AS, FREE-TALKER, CLAM, TONGUE TIED. ASSIGN INTERVIEWEE ON BASIS ON INITIAL RESPONSES TO APPROPRIATE TYPE.	
6.D.	MATCH STRATEGY TO RESPONSE STYLE. USE HUMAN RELATIONS SKILLS TO PUT INTERVIEWEE AT EASE REGARDLESS OF RESPONSE STYLE. USE ASSESSMENT OF INTERVIEWEE'S RESPONSE STYLE AS TRIGGER TO AN APPROPRIATE QUESTIONING STYLE ADAPTED TO COPING WITH PECULIARITIES/PROBLEMS OF	
6.D.	MATCH STRATEGY TO RESPONSE STYLE. (CONT.) PARTICULAR TYPE OF RESPONDENT, E.G. WITH A "CLAM" IT MAY BE NECESSARY TO USE "LEADING QUESTIONS".	

6.F.	LEADING QUESTIONS. USE LEADING QUESTIONS ONLY WHEN SOMETHING IS NEEDED TO ELICIT A RESPONSE TO AN AREA WHICH THE INTERVIEWEE HAS OVERLOOKED, TAKEN FOR GRANTED, OR AVOIDED. DO NOT USE LEADING QUESTIONS TO SHAPE INTERVIEW/STORY TO OWN PRECONCEPTIONS/PREJUDICES.	
6.F.	RESTORE Waning INTEREST. SHIFT DIRECTION OF INQUIRY OR CHANGE PACE OF INTERVIEW OR RETURN TO AREAS OF OBVIOUS INTEREST TO INTERVIEWEE.	

6.F.	SUFFICIENT TIME. ALLOW ORDINARILY, ENOUGH TIME FOR INTERVIEWEE TO THINK THROUGH HIS ANSWER BEFORE RESPONDING. TO ANSWER WITHOUT FEELING/APPEARING RUSHED/FLUSTERED, & TO REVISE HIS ANSWER AS HE REALIZES IMPLICATIONS OF WHAT HE HAS SAID. IF IMPROMPTU	
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CONTRACT NO. DABT60-81-C 0017
DATE PRINTED:
03/04/83
MOS: 710 TASK NUMBER: 214-176-1401
IPA-X
PAGE 6

STEP NUMBER PRINCIPLE STATEMENT

6 F. SUFFICIENT TIME.
(CONT.) RESPONSE (OFF THE-CUFF) IS DESIRED. ALLOW ONLY ENOUGH TIME FOR INITIAL REACTION

6.F. NORMAL TONE.
PRESSURE INTERVIEWEE BY USE OF NORMAL VOICE TONES THAT SITUATION IS NORMAL/NON-THREATENING.

6.F. ACTIVE LISTENING.
SIGNAL INTEREST/COMPREHENSION/ACCEPTANCE OF INTERVIEWEE BY MAINTAINING ALERT, COMFORTABLE POSTURE. SIGNAL I/C/A BY GIVING POSITIVE FEEDBACK, SUCH AS FACIAL EXPRESSIONS &/OR COMMENTS WHICH SIGNIFY UNDERSTANDING.

6.F. "ANNOYING" BEHAVIORS.
OBSERVE INTERVIEWEE FOR CUES SIGNALLING ANNOYANCE, SUCH AS INATTENTION, BELLIGERENCE, CHANGE OF COMPLEXION, CURT ANSWERS, SARCASM. ASSOCIATE ANNOYANCE REACTION WITH "ANNOYING" PERSONAL BEHAVIOR WHICH MIGHT BE THE CAUSE. MODIFY

6.F. "ANNOYING" BEHAVIORS.
(CONT.) BEHAVIOR OBSERVING WHETHER MODIFICATION REDUCES ANNOYANCE REACTIONS.

6.F. KEY WORDS/PHRASES.
RECOGNIZE WORDS/PHRASES WHICH SEEM IMPORTANT TO INTERVIEWEE. RECOGNIZE WORDS/PHRASES WHICH WERE SIGNIFICANT IN BACKGROUND RESEARCH.

6.F. QUOTABLE MATERIAL.
ASSESS QUOTABILITY ON BASIS OF SUCH CHARACTERISTICS AS NOVELTY, SIGNIFICANCE, CLEVERNESS OF STATEMENT, IMPORTANCE/AUTHORITY OF SPEAKER, SPEAKER'S OWN ASSESSMENT OF THE IMPORTANCE OF THE STATEMENT ETC. ERR, IF NECESSARY, ON THE

6.F. QUOTABLE MATERIAL.
(CONT.) SIDE OF COLLECTING TOO MUCH VERBATIM MATERIAL RATHER THAN TOO LITTLE.

6.F. PERMISSION QUOTING
VIEW REFUSAL TO PERMIT QUOTATION AS A CLUE TO AN AREA NEEDING FURTHER INVESTIGATION.

6.F. EYE CONTACT.
USE EYE CONTACT TO SIGNAL INTEREST/OPENNESS, USE EYE CONTACT TO INHIBIT EVASION BY INTERVIEWEE.

CONTRACT NO DAD160 81 C 0017

DATE PRINTED:
03/04/83

MOS: 710 TASK NUMBER: 214-176-1401

1PA-X

PAGE 7

STEP NUMBER PRINCIPLE STATEMENT

- 6.F. REASSURE.
GIVE REASSURANCE BY NONVERBAL AS WELL AS VERBAL MEANS. BUILD INTERVIEWEE'S CONFIDENCE IN CREDIBILITY OF REPORTER BY OFFERING UNSOLICITED REASSURANCE.
- 6.G. IS CONTINUATION POSSIBLE.
ASSESS WHETHER TO CONTINUE ON BASIS OF INTERVIEWEE'S REACTION TO THE DISRUPTION & ON COMFORT/DISCOMFORT IN SITUATION. IF EITHER PARTY (SELF OR SUBJECT) SEEMS UNABLE TO REFOCUS, RECOVER, DO NOT CONTINUE.
- 6.G. CHOICE OF STRATEGY.
FOLLOW OWN INCLINATION AT THE TIME.
- 6.H. SUMMARIZE.
VERIFY BY SUMMARIZING. THAT INTERVIEWEE WAS UNDERSTOOD. OFFER, BY SUMMARIZING, AN OPPORTUNITY FOR INTERVIEWEE TO CORRECT MISUNDERSTANDINGS. GIVE FEEDBACK TO INTERVIEWEE SO THAT HE MAY CORRECT ANY MISSTATEMENTS HE MAY HAVE MADE.
- 6.H. FOLLOW-UP CALL.
REINFORCE OWN CREDIBILITY, POSITONE UNWANTED QUESTIONS ABOUT RESULTING STORY BY ASSURING OPPORTUNITY AT A MORE APPROPRIATE TIME.
- 6.H. TIME FRAME.
GIVE ADDITIONAL ASSURANCE OF PROFESSIONALISM, INDICATE ASSURANCE OF A PLANNED PROGRESSION FROM ASSIGNMENT THRU INTERVIEW & FOLLOW-UP TO PUBLICATION.
- 7.A. PROCESS NOTES.
WRITE UP NOTES IN FULLER FORM WHILE IMPRESSIONS ARE STILL FRESH & CLEAR-CUT.
WRITE UP BEFORE TIME PASSAGE LEACHES AWAY VALUABLE DATA.

CONTRACT NO. DABT60-81-C-0017

DATE PRINTED:
03/03/83

MOS: 710 TASK NUMBER: 214-176-1401

KNOWLEDGE
ANALYSIS
PAGE 1

CATEGORY STEP NUMBER

STATEMENT

1.B
LIMITS ON PERSONAL KNOWLEDGE OF TOPIC

1.B
LIMITS TO TOPIC'S SCOPE AND DEPTH, AS IMPOSED BY PERSON ASSIGNING STORY

29F 1.B
EVALUATE CONSTRAINTS IMPOSED BY ASSIGNMENTS: LIMITS OF TIME

1.C
SEARCH OFFICE MORGUE/LIBRARY FOR RELATED MATERIAL

27G 1.C
PLAN RESEARCH SCOPE: SEARCH STANDARD REFERENCE (DICTIONARIES, ALMANACS,
ENCYCLOPEDIAS, ETC)

32E 1.C
TAKE THOROUGH NOTES ON MATERIAL RESEARCHED, ORGANIZE THEM FOR FUTURE
REFERENCE

33B 1.C
TAKE THOROUGH NOTES ON MATERIAL RESEARCHED, ORGANIZE THEM FOR FUTURE
REFERENCE

29F 2.A
COMPOSE WELL-ROUNDED SET OF QUESTIONS FOR INTERVIEWEES

28D 3.B
ASSIGN ORDER OF PREFERENCE/DESIRABILITY TO POTENTIAL INTERVIEWEES, CONSIDERING
THESE CRITERIA: NEWSWORTHINESS

3.B
PROXIMITY

3.B
AVAILABILITY

3.B
AUTHORITY

3.B
EXPERTISE

3.B
EXPECTED YIELD VIS A VIS CONTACT TIME

3.B
WILLINGNESS

27E 3.E
PROBE ACQUAINTANCES/COLLEAGUES OF POTENTIAL INTERVIEWEES FOR ADDITIONAL
BACKGROUND, USE RESULTS OF PROBING TO REVISE PREF/ORDER OF POTENTIAL INTVW

CONTRACT NO. DAB1A0-81-C-0017

DATE PRINTED:
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MOS: 710 TASK NUMBER: 214-176-1401

KNOWLEDGE
ANALYSIS
PAGE 2

CATEGORY STEP NUMBER

STATEMENT

29E 4.B
ARRANGE QUESTIONS IN A SEQUENCE WHICH SEEMS TO PROMISE ORDERLY PROGRESSION
THRU THE TOPIC
6.A
QUESTION RESPONSIVELY, RELATING NEXT QUESTION TO PRECEDING RESPONSE
6.A
GENERATE NEW QUESTIONS TO HANDLE CONTINGENCIES
6.A
CONDUCT INTRODUCTORY DIALOGUE, BRIEFLY RESTATING PARAMETERS OF ASSIGNMENT
27E 6.A
QUESTION INTERVIEWEE FOLLOWING THIS PROTOCOL: BEGIN WITH LEAD-IN QUESTION, THEN
MOVE TO OTHER PREPARED QUESTIONS
6.F
WRITE QUOTABLE MATERIAL IN FULL
31B 6.F
RECORD INTERVIEWEE RESPONSES AS COMPLETELY AS NEEDED FOR LATER RECALL. WRITE
KEY WORDS/PHRASES
33B 6.H
CLOSE INTERVIEW BY REVIEWING NOTES QUICKLY, SUMMARIZING MAIN POINTS COVERED
36H 7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES
33B 7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES
32E 7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES
35C 7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES
36F 7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES

CONTRACT NO. DAB160-81-C-0017
DATE PRINTED
03/08/83

MUS: 719
FKRATA
TASK NUMBER: 214-176-1401

TPA-2
STEP NO.
6.6.3.D.

RECOMMENDED CHANGES AND REASONS
DELETE ENTIRE LINE.

Example 4: Ft. Sam Houston

1

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TASK PERFORMANCE ANALYSIS

STEP SUMMARY J 1 B STEP STATEMENT

CONSEQUENCE
CONSEQUENCE

1	IDENTIFIES BASIC ANATOMY AND PHYSIOLOGY OF THE MUSCULOSKELETAL SYSTEM.	
1 A	IDENTIFIES MAJOR FUNCTIONS OF SKELETAL SYSTEM.	
1 B	IDENTIFIES MAJOR DIVISIONS OF SKELETAL SYSTEM.	
1 B.1	HEAD OR SKULL.	
1 B.2	TRUNK.	
1 B.3	UPPER EXTREMITIES.	
1 B.4	PELVIC GIRDLE.	
1 B.5	LOWER EXTREMITIES.	
1 C	IDENTIFIES BASIC STRUCTURAL ELEMENTS OF BONES.	
1 C.1	IDENTIFIES THE VARIETIES OF BONES AND FUNCTIONS OF EACH (IE LONG, SHORT, SMALL, FLAT AND IRREGULAR).	
1 C.2	IDENTIFIES THE BASIC COMPOSITION OF BONES.	
1 D	IDENTIFIES THE MAJOR BONES OF BODY, BOTH THEIR MEDICAL AND COMMON NAMES AND ANATOMICAL LOCATIONS OF EACH.	
1 E	IDENTIFIES ANATOMICAL CONNECTIONS/PARTS INVOLVED IN PROTECTION, MOVEMENT, AND HOLDING TOGETHER BONES.	
1 E.1	IDENTIFIES JOINTS AND THEIR FUNCTIONS.	
1 E.2	IDENTIFIES TYPES OF JOINTS AND EXAMPLES OF EACH.	
1 E.3	IDENTIFIES BURSA SAC AND ITS FUNCTION.	
1 E.4	IDENTIFIES LIGAMENTS AND THEIR FUNCTIONS.	
1 E.5	IDENTIFIES CARTILAGE AND THEIR FUNCTIONS.	
1 E.6	IDENTIFIES TENDONS AND THEIR FUNCTIONS.	
1 E.7	IDENTIFIES POSITIONAL/SPATIAL ORIENTATION OF BONES, LIGAMENTS, TENDONS, CARTILAGE, BURSA, AND JOINTS TO EACH OTHER.	
1 F	IDENTIFIES THE MAJOR FUNCTIONS OF MUSCULAR SYSTEM.	
1 F.1	IDENTIFIES THE GENERAL STRUCTURE OF THE MUSCULAR SYSTEM.	
1 F.2	MUSCLES ARE COMPOSED OF BUNDLES OF FIBERS HELD TOGETHER BY CONNECTIVE TISSUE.	
1 F.3	MUSCLES ARE CATEGORIZED INTO TWO MAJOR TYPES, VOLUNTARY (MUSCLES MOVED VOLUNTARILY, STRIATED) AND INVOLUNTARY (MUSCLES NOT CONTROLLED CONSCIOUSLY, SMOOTH).	
1 G	IDENTIFIES THE MAJOR MUSCLES OF THE BODY AND ANATOMICAL LOCATIONS OF EACH.	
1 G.1	IDENTIFIES COMMON CONDITIONS/DISORDERS INTERRUPTING NORMAL PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM DUE TO TRAUMA OR DISEASE AND ASSOCIATED SIGNS AND SYMPTOMS.	
1 G.2	FRACTURES.	
1 G.3	SPRAINS.	
1 G.4	STRAINS (END OF TASK).	

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CONTRACT NO. DART69 81 C 0017

PROJ. 91B TASK NUMBER: 081-360-0021

IPA-3

CATEGORY: SELF NUMBER

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PAGE 1

STATEMENT

THE FOLLOWING AND CODES BELOW ARE REFERENCED IN OTHER 91B TASKS.

57A IDENTIFIES MAJOR FUNCTIONS OF SKELETAL SYSTEM.

57B IDENTIFIES MAJOR DIVISIONS OF SKELETAL SYSTEM.

57C IDENTIFIES BASIC STRUCTURAL ELEMENTS OF BONES.

57D IDENTIFIES THE MAJOR BONES OF BODY, BOTH THEIR MEDICAL AND COMMON NAMES AND ANATOMICAL LOCATIONS OF EACH.

57E IDENTIFIES ANATOMICAL CONNECTIONS/PARTS INVOLVED IN PROTECTION, MOVEMENT, AND INCLUDING TOGETHER BONES.

57F IDENTIFIES POSITIONAL/SPATIAL ORIENTATION OF BONES, LIGAMENTS, TENDONS, CARTILAGE, BURSA, AND JOINTS TO EACH OTHER.

57G IDENTIFIES THE MAJOR FUNCTIONS OF MUSCULAR SYSTEM.

57H IDENTIFIES THE GENERAL STRUCTURE OF THE MUSCULAR SYSTEM.

57I IDENTIFIES THE MAJOR MUSCLES OF THE BODY AND ANATOMICAL LOCATIONS OF EACH.

57J IDENTIFIES COMMON CONDITIONS/DISORDERS INTERRUPTING NORMAL PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM DUE TO INJURY OR DISEASE AND ASSOCIATED SIGNS & SYMPTOMS.

57K IDENTIFIES THE BASIC ANATOMICAL STRUCTURE OF EACH MAJOR DIVISION.

ATTACHMENT H

ETAP Report Description

ETAP REPORT DESCRIPTION

I. TPA-1

1. MOS Number and Name
From AR-611-201, Enlisted Career Management Fields and Military Occupation Specialties.
2. Task Number
From GFM (SM, Task Lists), as revised.
3. BSEP
Tasks trained in residence to qualification in IET are BSEP I. Others are BSEP II.
4. Task Statement
From the field analyst's sources--SM, Task List.
5. Manuals
The Soldier's Manual or Task List for that MOS, and the date issued.
6. Analysis Site
A 4-character code.
7. Date Started
The date analysis started.
8. Date Completed
When all events were completed and the ETAP results were ready to be sent to Cherry Hill.
9. Hours
The number of hours spent on the initial interview and write-up of this task.
10. Original Analysis
The initial interview with SME.
11. Verification
The date the analysis was reviewed with a second SME.
12. Instructional Review
The date the analysis was reviewed with a school instructor. As of 22 March 1982, an instructional review process was not completed for BSEP II tasks unless the task was resident trained.
13. Task Synopsis
Usually an expanded task statement, clarifying the dimensions of the task.
14. Equipment
Major material items, e.g. tools, supply items and test equipment.

required to successfully complete the task.

15. Comments
Pertinent observations by the analyst and/or qualifying statements of the SME.
As of Sept 81, certain "comments" were identified as discrepancies. For this project, a discrepancy is a difference between job requirements in the field as identified by SMEs and doctrinal procedures included in the RMs, TMs, resident training, etc.
Comments that were identified as discrepancies are shown on the TPA-1 report as the last entries in the Comments section, and are preceded with an asterisk (*) in the first position.
- 15a. The headline of the Comments section will indicate ERRATA or NO ERRATA. If ERRATA, there will be an attachment. See section V below.
16. Major Steps
The major steps, as identified by the analyst, with the SME, that must be performed to successfully complete this task.
17. (Comments Attached)
When entries on the TPA-1 form in the Task Synopsis, Equipment, Comments or Major Steps sections exceed the space provided on the TPA-1 report, the only entry made in the effected section of the report is, "See comments attached". The entries are reported on an attachment to the TPA-1 report, under the appropriate heading.
18. Motor Skills
As of July 1982, certain motor skills were identified as applicable to certain tasks. For final delivery, the Motor Skills section is shown on each TPA-1 report, and its headline shows ANALYZED or NOT ANALYZED. If analyzed, the applicable motor skill designations are preceded with an "X".

II. TPA-2

1. Step Number
TPA-2s were written using generally accepted outline numeration procedures -- i.e. Roman numeral, upper-case alpha, Arabic numeral, etc. At entry, we converted the step numbers to a computer-compatible format of numeric-then-alpha sequence, with dots delimiting the levels of specificity.
The word RESOURCE in the step number field indicates that a manual, chart, etc. is available to the soldier for reference in performing this step.
2. Step Statement
The words of the various analysts were--to the extent possible--faithfully reproduced. Step Statements were indented based on a mathematical formula that operates on the Step Number. This gives a hierarchical representation of the procedural analysis.
If the word RESOURCE is in the step number field, the identification of the manual, chart, etc. that is available will be shown in the related step statement field.
Project-specific editing rules were established to handle such

areas as

- job aid and resource citation
- using abbreviations IAW AR-310-50
- expressing mathematical formulae
- cross-referencing between ETAPs
- recording and reporting symbols.

3. Prerequisite Competencies Codes

As part of ETAP event 10, analysts attempted to determine from the SME what a soldier must know to successfully perform the task. For "new format" MOS (see VII below), the results of this effort are presented on the TPA-2 form and report. The category shown is the code of an entry on the taxonomy.

4. J - Intrinsic Job Aids

If a TM, FM, manufacturer's manual, conversion chart, etc., is required for the successful completion of the job step, it is cited in the step statement, and a plus sign (+) is shown in the "J" column of the TPA-2 report.

5. I - Instructional Review

If an instructor told the analyst that particular job steps were not taught as part of resident training, the analyst noted that fact on the TPA-2. This information is reported through the appearance of a dollar sign (\$) in the "I" column on the TPA-2 report. Statements thus identified are technical prerequisites. It should be noted that determining the degree of instruction (the continuum from familiarity to mastery) is not part of the ETAP procedure.

6. D - Decision Points

Step statements beginning with the words
if, select(s), determine(s), choose(s), consider(s),
decide(s), judge(s), and observe(s)
are further highlighted with a less-than symbol (<), or parat, in the "D" column of the TPA-2 report. This is a programming notation that was agreed upon.

7. Subtasks

Subtasks are a set of job steps, previously analyzed or pre-analyzed, that represent a piece of work that may be repeated in other tasks. Analysts may have referred to subtasks rather than re-writing common job steps. When a subtask is printed within a TPA-2 report, its title is shown, the step statements are indented and steps are numbered beginning with step 51.

III. TPA-3

As part of event 10, analysts attempted to determine from SMEs what a soldier must know to successfully perform the task. The results of this effort are presented on the TPA-3 form and report. The category shown is the code of an entry on the taxonomy. A step number is shown to direct the reviewer to a specific location on the procedural analysis where the application of this knowledge is needed. If the analyst was told that the knowledge is not

As a result of resident training, a "6" is shown in the "6" column of the TPA-3 report.

IV. KNOWLEDGE ANALYSIS

As a result of a home office review of the field analysis, prerequisite competencies were identified within the context of the task. The knowledge analysis report shows the taxonomy code, a procedural locator (to the TPA-2), and the prerequisite competency indicator statement.

V. ERRATA

Results of the review process conducted at the schools, and reported to RPA on TPA-300 Form 314-R, that were judgemental in nature or that would have added or deleted procedural steps, are reported on an Errata report. Analysis results having Errata reports attached are identified with the legend "COMMENT" "ERRATA" on the Comments section headline.

VI. TPA-X

When a task was analyzed using the principle transfer approach, a TPA-X report is included, listing the underlying principles identified within the context of that task. The statements are grouped topically and accompanied by a locator.

VII. OLD FORMAT MOS

With the introduction of the elaborated taxonomy in April 1982, prerequisite competency codes were applied to the TPA-2 form and report, rather than to the TPA-3 and Knowledge Analysis forms and reports. To accommodate this change, task analysis results for all tasks in 24 MOS are delivered in "old" format--that is, with TPA-3s and KAs. The old format MOS are:

05B	16D	31M	57E	67U	71Q
05C	16E	43M	61B	58G	75B
13F	26L	44B	63H	71D	76X
15D	26Q	44E	63W	71L	96B

ATTACHMENT I

Guidance for Processing Analysis Review Comments

MOS BASELINE SKILLS PROJECT

CONTRACT NO. DABT 60-81-C-0017

PROCEDURE FOR PROCESSING TRADOC FORM 314-R, MOS TASK ANALYSIS REVIEW

Based upon the review process conducted at each individual school and the results reported to RCA on TRADOC Form 314-R, final corrections have been made to the ETAPs. All review comments are on file both at TRADOC and at RCA. In deciding how to incorporate the review comments, the following criteria were employed by RCA:

1. Changes were made directly onto the ETAP printout for technical changes in steps (e.g., "150 PSI" should be "105PSI"), typographical errors ("from" to "form"), additional prerequisite competency indicator statements (add 41G at step 1.B.1.), additions to the equipment list (add torque wrench), and additions to a single step.
2. Changes were reported on a separate ERRATA sheet whenever a step was added (add new step 2.C.1.A. "Torque bolts") or deleted (delete steps 3.D through 3.D.3.). Because these changes would alter the numbering system and totally confuse any cross-references in other tasks, they were not incorporated directly onto the ETAP. Also, non-specific comments about the task ("task number has been changed to 999-999-9999" or "task analysis should be redone") were placed on the ERRATA sheet.
3. Comments of a judgmental nature ("This was a good analysis") were not placed on the ERRATA sheets. These comments will be kept on file at both TRADOC and RCA, however. Likewise changes which would violate the conventions used during the entire ETAP process were not incorporated.
4. In accordance with directions from the COR, the review identified tasks as "approved", "approved with change," or "disapproved." If review comments (changes) were provided for tasks which were either "approved with changes" or "disapproved" these comments (changes) were handled as described above. Also, "disapproved" was noted on ERRATA sheets. Reanalysis was not performed.

Some of the conventions which resulted in misunderstandings during the review process were:

- a. Cross-references to other tasks in the same MOS need not include an MOS identifier in front of the task reference.
- b. Old format tasks which contain cross-references on the Knowledge Analysis page did not require a prerequisite competency (PC) indicator.
- c. On the Knowledge Analysis pages of old format tasks, the step locator need not go beyond the second level (e.g., 3.3).
- d. Additions to the taxonomy developed by the individual schools as a result of the review process were not incorporated into the ETAP printout. Obvious erroneous PC codes were corrected using the existing taxonomy.

- e. The conversion from the old to the new taxonomy allowed for general citations such as "01" as opposed to "01A" or "01D" on the old format tasks. Old format tasks might also carry the codes 45, 47, or 48 which denote motor skills, equipment usage, or "other".
- f. Subcategories for 45 and 46 (Motor Skills) apply only to new format tasks. Within the new format they apply to the task as a whole, are shown on TPA-1, and will never appear as PC code entries on TPA-2.
- g. RCA analysts used an expanded taxonomy which included the category 41H: Interpret Codes and Symbols.
- h. Differences of opinion about what constitutes a major step were not reported during final corrections.
- i. ETAPs are presented in a clipped outline style which ignores many standard grammatical rules. For reasons of cost efficiency, changes in grammar and punctuation were incorporated only when failing to do so would make the sentence unclear or when a specific entry for a form was cited (e.g., Write "Number of Gallons:" in Block 6).
- j. For old format tasks, new PC codes identified as a result of the review process were incorporated onto the ETAP. Additional citations of identified PC codes could appear on the ERRATA sheet.
- k. Tasks for which no review comments were received were assumed to be accepted with no changes.
- l. To avoid misinterpretation ERRATA comments were reported as written.
- m. The presence or absence of ERRATA will be indicated in the "Comments" headline of TPA-1 for each task.

Cherry Hill, NJ
11 March 1983

ATTACHMENT J

Taxonomy Developed for Use with Analysis

- Item 1 - Initial Version
- Item 2 - Expanded Version
- Item 3 - Elaborated Version
- Item 4 - Explanation of Conversion

Revised April 1964

Item 1 - Initial Version

Item 2 - Expanded Version

1. Analytical Direction To obtain information from a highly-structured, step-by-step description in order to accomplish a specific task activity.

- a) Identify the task activity in a given paragraph.
- b) Locate the topic sentence, or part of a reading selection that answers questions, match descriptions, or implies conclusions.
- c) Locate parts of reading material for a given purpose.
- d) List specific details to support the main idea.
- e) Given a topic, idea, main, synthesize information into a written sequence.
- f) Follow directions.
- g) Follow directions given in reading material.
- h) Classify information statements, separate them sequentially into a paragraph.
- i) Arrange sentences, paragraphs, or events in a sequential order.
- j) Organize a given selection according to a time or ordering sequence.
- k) Identify the main idea.
- l) Identify the main idea, specifically or implicitly stated, in a reading selection.
- m) Select sentences in a given selection that are subordinate to the main idea.
- n) Select sentences in a given selection that are subordinate to the main idea.
- o) Synthesize, making a sentence shorter by maintaining the essential meaning.
- p) Understanding of a reading selection to evaluate ideas, answer logical questions, establish proof and to determine authenticity.

2. Analytical Applying information presented in a job aid, where reading is required in combination with the use of graphics, maps, symbols, flow diagrams and schematics in order to perform a sub-task activity.

- a) Identify the task activity from illustrative materials.
- b) Answer factual questions, or recall of details, from illustrative materials.
- c) Identify the task activity, combining text with illustrations.
- d) Answer factual questions, or recall of details, combining illustrations with text.
- e) Answer questions to test and activity to directions.
- f) Answer questions to test and activity to directions.
- g) Select parts of text and visual material for a given purpose.
- h) Select words, phrases, actions of visual material, related to task performance.
- i) Select words, phrases, actions of visual material, related to task performance.
- j) Identify, interpret, paragraph, and word used to perform a task.
- k) Identify, interpret, paragraph, and word used to perform a task.
- l) Identify, interpret, paragraph, and word used to perform a task.
- m) Identify, interpret, paragraph, and word used to perform a task.
- n) Identify, interpret, paragraph, and word used to perform a task.
- o) Identify, interpret, paragraph, and word used to perform a task.
- p) Identify, interpret, paragraph, and word used to perform a task.
- q) Identify, interpret, paragraph, and word used to perform a task.
- r) Identify, interpret, paragraph, and word used to perform a task.
- s) Identify, interpret, paragraph, and word used to perform a task.
- t) Identify, interpret, paragraph, and word used to perform a task.
- u) Identify, interpret, paragraph, and word used to perform a task.
- v) Identify, interpret, paragraph, and word used to perform a task.
- w) Identify, interpret, paragraph, and word used to perform a task.
- x) Identify, interpret, paragraph, and word used to perform a task.
- y) Identify, interpret, paragraph, and word used to perform a task.
- z) Identify, interpret, paragraph, and word used to perform a task.

3. Locate Using written aids (Tables of Contents, Appendixes, Indexes, Directories, Directories, ...) in order to locate more detailed sub-task related information.

- a) Identify appropriate document for given purpose.
- b) Determine from various sources whether information concerning the task is contained within the context of the document.
- c) Distinguish between relevant and irrelevant information for a particular purpose.
- d) Use index, table of contents, glossary, etc., to locate specific information.
- e) Identify specific information in documents pertaining to the title page, preface, index, glossary and appendix.
- f) Select the information needed to complete a task.
- g) Locate the pages on which information concerning the task would appear.
- h) Select pages and subpages from the index of a document that refers to the information needed to answer questions or to solve problems concerning the task.
- i) Given a problem with a task, select the information which would be useful in solving the problem.
- j) Use cross referencing to locate information in various sources.
- k) Locate specific information from various sources.
- l) Organize and sequence information from various sources.
- m) Organize and sequence information from various sources.
- n) Organize and sequence information from various sources.
- o) Organize and sequence information from various sources.
- p) Organize and sequence information from various sources.
- q) Organize and sequence information from various sources.
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- t) Organize and sequence information from various sources.
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- v) Organize and sequence information from various sources.
- w) Organize and sequence information from various sources.
- x) Organize and sequence information from various sources.
- y) Organize and sequence information from various sources.
- z) Organize and sequence information from various sources.

4. Specification Using tables, graphics, charts, or written text to determine a fact, standard, tolerance, or rule to which a sub-task procedure must conform.

- a) Locate specified information in the material.
- b) Select words, phrases, or numerical values that support a conclusion.
- c) Identify factual details in reading material which may be used to provide only specific consequences in task performance.
- d) Draw comparisons and contrasts between specific information and the situation.
- e) Apply rules to be observed, in a case and effect relationship, that must be followed to achieve satisfactory task performance.
- f) Distinguish among alternative choices.
- g) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- h) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- i) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- j) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- k) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- l) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- m) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- n) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- o) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- p) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- q) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- r) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- s) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- t) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- u) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- v) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- w) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- x) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- y) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.
- z) Distinguish, when alternative choices are available, the best choice to be made to conform with a standard or tolerance.

5. Terminology Recognizing and applying the specific vocabulary and terminology used in the job environment.

- a) Know meaning of specific words, contractions and abbreviations.
- b) Know meaning of common contractions (e.g., that, relative, others, etc.).
- c) Know meaning of common prefixes and suffixes.
- d) Know meaning of common prefixes and suffixes.
- e) Know meaning of common prefixes and suffixes.
- f) Know meaning of common prefixes and suffixes.
- g) Know meaning of common prefixes and suffixes.
- h) Know meaning of common prefixes and suffixes.
- i) Know meaning of common prefixes and suffixes.
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- k) Know meaning of common prefixes and suffixes.
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- v) Know meaning of common prefixes and suffixes.
- w) Know meaning of common prefixes and suffixes.
- x) Know meaning of common prefixes and suffixes.
- y) Know meaning of common prefixes and suffixes.
- z) Know meaning of common prefixes and suffixes.

6. Recognition Identifying, without sub-tasks, directions to be made regarding systems, signs, shapes, colors and sounds.

- a) Identify similarities and differences among items.
- b) Identify similarities and differences among items.
- c) Identify similarities and differences among items.
- d) Identify similarities and differences among items.
- e) Identify similarities and differences among items.
- f) Identify similarities and differences among items.
- g) Identify similarities and differences among items.
- h) Identify similarities and differences among items.
- i) Identify similarities and differences among items.
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- u) Identify similarities and differences among items.
- v) Identify similarities and differences among items.
- w) Identify similarities and differences among items.
- x) Identify similarities and differences among items.
- y) Identify similarities and differences among items.
- z) Identify similarities and differences among items.

7. Safety Observing rules and procedures that may be required to avoid injury or damage to equipment or materials.

- a) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- b) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- c) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- d) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- e) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- f) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- g) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- h) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- i) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- j) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- k) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- l) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- m) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- n) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
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- p) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
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- w) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- x) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- y) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.
- z) Identify rules and procedures that may be required to avoid injury or damage to equipment or materials.

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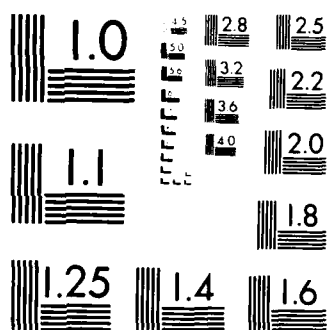
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

27

UNCLASSIFIED

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NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

Revised April 1984

Item 3 - Elaborated Version

NUMERATION/PLACE VALUE

NT

1. NUMBER AND COUNTING

- Match objects with words, figures and models.
- Write numerals in the correct place value order from any starting point.
- State what numeral can be written before or between any two given numerals.
- Select the value of which is a larger/smaller from a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit, whole or decimal.
- Round off a number to a specified place, whole or decimal.
- Count by ones, tens, fives, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or $^\circ$ as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 miles.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances.

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NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display readout.
- Recognize a "read off" from a gauge with color divisions.
- Recognize positive (+) and negative (-) denotation on a scale.
- Select band(s) from a multi-scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered unmarked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of acquired measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs.
- Relate geometric symbols and graphic representations to actual systems, subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number or a single letter.

65-7

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauge dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa using a calculator or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}\text{F}$ or $^{\circ}\text{C}$) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

28

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify the key facts of a procedure or activity and are not a step in a sequence of steps.
- Identify the key facts of a procedure or activity and are not a step in a sequence of steps.
- Identify the key facts of a procedure or activity and are not a step in a sequence of steps.
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- Identify the key facts of a procedure or activity and are not a step in a sequence of steps.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Identify the meaning of common contractions, abbreviations and acronyms.
- Recognize the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source.

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skimming reading, whether the information is relevant.
- Cross-reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action.

4/23/82

VISUAL AIDS

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29. ILLUSTRATIONS

- Identify details of an illustration and parts of an illustration.
- Identify details of an illustration and parts of an illustration.
- Identify details of an illustration and parts of an illustration.
- Identify details of an illustration and parts of an illustration.
- Identify details of an illustration and parts of an illustration.
- Identify details of an illustration and parts of an illustration.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual information to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Revise all recorded details in sentence form.
- Organize all sentences into paragraphs.

59

NT

34. OUTLINING (topic or sentence)	
a. Distinguish between major and subordinate topics	
b. Generate titles for each major topic selected	
c. Use phrases or sentences to provide subordinate details under each major topic	
d. Alternate, indent numbers and letters to establish a hierarchy	

35. REPORT WRITING	
a. State the intent or objective(s) of the report	
b. Describe the parameters of the event or situation	
c. Distinguish between relevant and irrelevant details	
d. Sequence events in the order they have occurred	
e. State general impressions of events described	
f. Select examples that will clarify major issues presented in the report	
g. Examine opposing points of view in the report	
h. Summarize the major points developed in the report	
i. Justify an action taken and give reasons for rejecting alternatives	

36. EDITING	
a. Spell frequently used words correctly	
b. Spell task related words correctly	
c. Identify words that need to be capitalized	
d. Correct all misspelled words with or without the use of a reference source	
e. Apply all rules for end marks, commas, and apostrophes	
f. Apply common rules of grammar	
g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence	
h. Appraise an entire written communication and make adjustments to improve clarity	

VERBAL COMMUNICATION

37. TYPE	
a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed	
b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide	
c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task	
d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done	
e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task	
f. Briefing - communicating final instructions to others or giving an account in summary	
g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision	
h. Command - communicate to others in order or action to be taken where a person has a position of authority	

4/23/82

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38. CHARACTERISTICS	
a. Enunciate clearly, using the proper rate of speech	
b. Use technical vocabulary suitable to the task and level of the person	
c. Determine the appropriate amount of information to communicate	
d. Interpret figurative or idiomatic language by reference to its use in context	
e. Follow highly detailed, step by step directions	
f. Solicit feedback to confirm the accurate reception of the communication	
g. Recognize when a low key, informal dialogue is suitable	
h. Recognize when direct verbal commands are necessary	
i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort	
j. Recognize when the situation will require a structured, preplanned method of presentation	

39. BARRIERS	
a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences	
b. Recognize personality factors and inter-personal relationships that may exist	
c. Recognize feedback as a means of communicating more effectively and increasing task competence	

SAFETY/SECURITY

40. PRECAUTIONS	
a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment	
b. Apply preventive measures prior to task performance to minimize any potential safety or security problem	
c. Select an appropriate course of action in the event of an emergency	

PERCEPTUAL

41. RECOGNITION	
a. Identify similarities and differences between and among objects	
b. Use body language (motions, gestures, postures) to communicate or signal	
c. Determine the presence of a defect or extent of damage	
d. Match objects by size, shape, color and significant markings	
e. Classify objects by size, shape, color and significant markings	
f. Determine direction, duration, and intensity of sounds, sightings and smells	
g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action	

h. Interpret codes and symbols

J-10

Task _____

page _____ of _____

MOTOR SKILLS45. Functions

- _____ a. Multi-Limb Coordination — coordinate gross movements requiring use of larger skeletal muscles for strength
- _____ b. Manual Dexterity — make skillful, controlled arm, hand movements in manipulating large objects under speed conditions
- _____ c. Control Precision — highly controlled, precise muscular adjustments, operating controls by hand, arm or foot movements. Speed and accuracy
- _____ d. Response Orientation — select appropriate response, each pattern of signals requires a different choice of controls and direction of movement. High speed and accuracy
- _____ e. Reaction Time — speed with which an individual is able to respond to an auditory or visual stimulus
- _____ f. Rate Control — make continuous anticipatory motor adjustments relative to changes in speed of a moving target. Pursuit and tracking
- _____ g. Finger Dexterity — skillful, controlled manipulations of small objects, primarily finger movements
- _____ h. Arm-Hand Steadiness — make precise arm-hand positioning movements where strength and speed are minimized
- _____ i. Wrist-Finger Speed — make rapid, precise turning, tapping, tripping, aligning motions in response to auditory or visual stimuli

Other: _____

46. Operations

- _____ a. Operate equipment or be a crew member engaged in manually lifting or moving objects
- _____ b. Uses hand tools considered to be common. Determines sizes and selection. Pliers, screwdrivers, hand drills. Simple mechanical operations, mainly remove and replace
- _____ c. Install, relocate and remove
- _____ d. Adjust, repair, maintain mechanical, electrical, hydraulic systems or subsystems. Disassemble and assemble, using hand tools
- _____ e. Testing equipment used in the production, transmission, distribution, and utilization of energy sources
- _____ f. Cutting, bending, trimming, welding, riveting, etc. to force, shape or fabricate materials
- _____ g. Operator checks and services in response to a variety of external stimuli (sounds and sights)
- _____ h. Possess the physical ability to perform in combat or police actions
- _____ i. Clerical duties: maintaining records, operating office machines, processing data using electronic machines
- _____ j. Perform acts requiring skill and care on injured or infirmed persons

Other: _____

Revised April 1984

Item 4 - Explanation of Conversion

Need For Conversion

As shown in this attachment taxonomy development consisted of three main phases. Each version of the taxonomy was an expansion that accounted for information from previous version(s) and for new information resulting from the on-going analysis effort. To ensure for uniformity of results and to assist with product usability, all analysis reporting was in terms of the codes from the elaborated taxonomy.

Conversion Process

To convert from previous version(s) to the elaborated taxonomy, a cross-match was made between previous codes and codes on the elaborated taxonomy. This cross-match table was then entered into the data processing system and the conversions were made. Three (3) areas could not be cross-matched and appear as follows on the analysis reports:

<u>Code</u>	<u>Explanation</u>
45	Motor skills
47	Equipment usage
48	Other

ATTACHMENT K

Analysis Related Reports Produced Via Data Processing

<u>CDRL Reference</u>	<u>Report Title</u>
A004	MOS Baseline Skills Profile (except summary)
A004	Analysis Data
A004	Task Statement List
A004	Task Statement List (Complete)
A004	Subtask Statement List
A004	Subtask Statement List (Complete)
A004	Discrepancy Statement List
A004	Knowledge Statement List
A004	Technical Prerequisite Statement List
A004	Prerequisite Competency Indicator Statement List
A004	Prerequisite Competency Indicator Statement List (Complete)
A004	Matrix of Prerequisites
A006	Clustering Report (data only)
A005	IETCSS Report (data only)
A012	Preliminary IETCSS Report (data only)

Derivation of Task Analysis Reports

Analysis reports, all in response to CDRL Sequence Number A004, are characterized as analysis results (data) and summary reports. Figures 1 and 2, below, show the derivation of each report. Two (2) additional reports were produced. The first is an operational summary that describes major features of events associated with conducting the task analysis effort. The second is a matrix which provides prerequisite competency frequency and percentage of frequency of occurrence data on an MOS-by-MOS basis by BSEP level.

Listing and Description of Analysis Reports

The separate analysis reports and a brief description of each are as follows:

1. Analysis Data (Results) - A two- or three-part report, on a task-by-task basis. Contains descriptive information on the task, including discrepancies; the hierarchical arrangement of task analysis information; and prerequisite competency information.
2. Operational Summary - As noted above, describes major features of events associated with conducting the task analysis effort; presented mainly on an MOS-by-MOS basis.
3. Task Statement List - Presented on an MOS-by-MOS basis and as a complete listing. Shows shared tasks and common tasks.
4. Subtask Statement List - Presented as a listing of titles which shows the original task and all other tasks that use the subtask. Also, presented with all steps and substeps (complete subtask).
5. Discrepancies - Information on variance between doctrine and stated procedure and performance of procedure as reported by an SME.
6. Knowledge Statements - Statements obtained from SME in response to questions concerning information related to task performance; may include entries from the taxonomy.
7. Technical Prerequisites - A procedural (action) statement within task analysis results (data) which is identified as not instructed as a result of enactment of the instructional review process.
8. Prerequisite Competency Indicator Statements - Procedural (action) statements within task analysis results (data) and the attendant prerequisite competency statement code. Presented on both an MOS-by-MOS and complete basis.
9. Matrix - As noted above, provides prerequisite competency frequency and percentage of frequency of occurrence data on an MOS-by-MOS basis by BSEP level.
10. MOS Baseline Skills Profile - Presented on an MOS-by-MOS basis by BSEP level. Contains: prerequisite competencies, example prerequisite competency indicator statements, frequency of occurrence of prerequisite competencies, and descriptive summary information.

Figure 1

RCA/BSEP ANALYSIS, CLUSTERING AND DESIGN INFORMATION FLOW FOR 24 MGT
TO BE DELIVERED USING THE ORIGINAL BSEP TAXONOMY

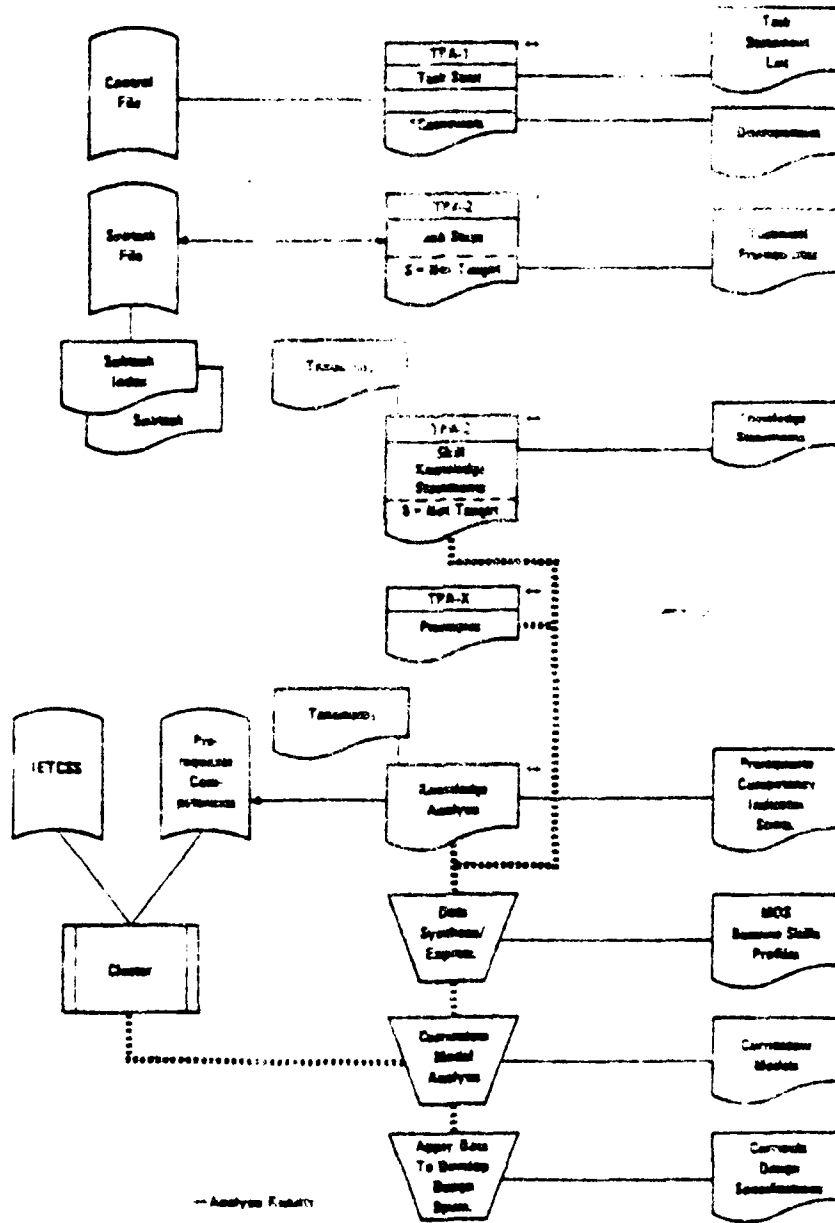
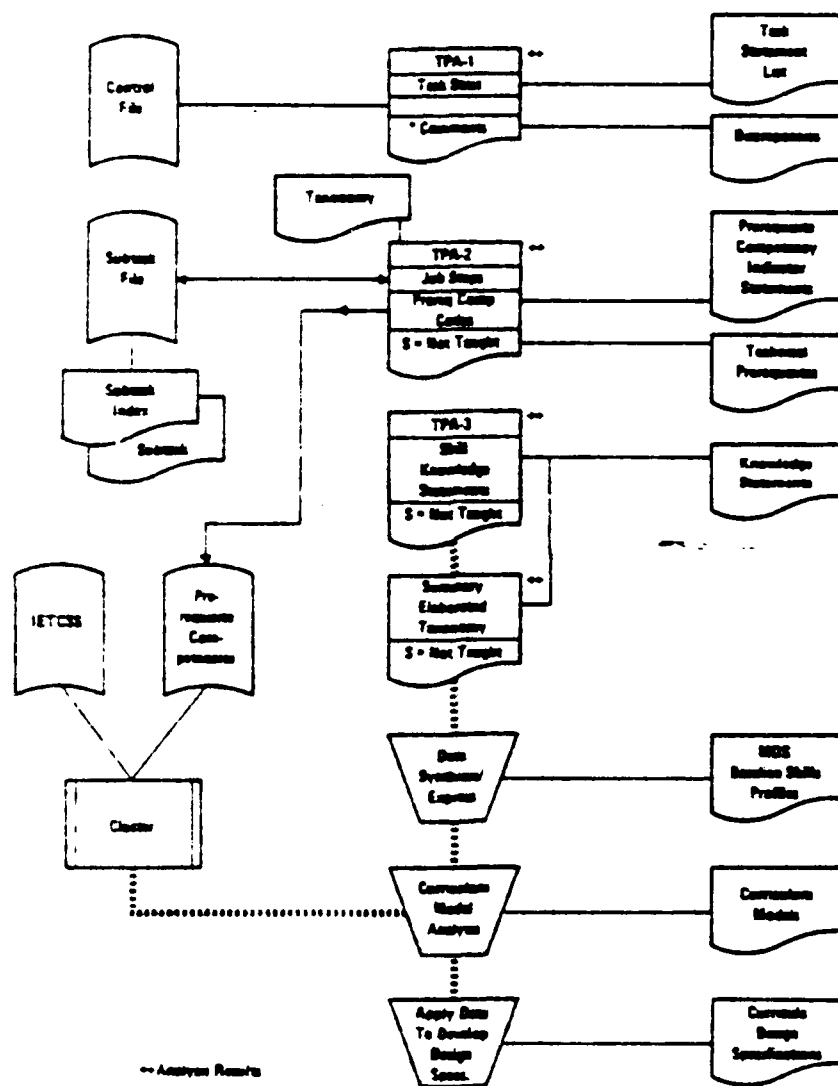


Figure 2

RCA/SEP ANALYSIS, CLUSTERING AND DESIGN INFORMATION FLOW FOR 72 MDS
TO BE DELIVERED USING THE ELABORATED SEP TAXONOMY



Formats for Final Reports

As shown on the listing of reports at the beginning of this attachment and on figures 1 and 2, two analysis products were required from completion of the project. One product was the analysis data which were to be obtained by "using an action and hierarchical analysis procedure" and which were to be prepared in a hard copy format "capable of being entered into a computer compatible system of hierarchical display and search." The other product was to be the MOS Baseline Skills Profile for each MOS. A description of how the formats for the final reports were derived includes the following major operational decisions and/or considerations:

1. Data recording forms were developed during the initial stages of the project. To gain efficiency in data collection; forestall cost considerations related to input, data manipulation, and data file upkeep associated with flowcharts and other graphic presentations; and attempt to standardize recording conventions, a procedural outline approach was recommended with a step, substep coding system that used numeric and alpha characters to denote structure in a hierarchical manner.
2. Analysis efforts were recognized early in the project as being very labor intensive, especially the time needed to accurately record and verify the information obtained from interviews with SME's. In response to this situation several approaches were recommended to streamline the analysis effort. These approaches were as follows:
 - a. Use of subtasks and subtask inventories as described earlier. Limited use of subtasks was possible due to the level of specificity of analysis results. However, a method of documenting the use of subtasks was recommended and utilized in the printing of analysis results.
 - b. Use of cross references in which analysts could refer to previous analysis results. Documentation guidelines were developed, recommended, and utilized in the printing of cross references.
 - c. Replicate analysis procedures were recommended and utilized to accommodate shared and common tasks. Conventions for noting the results of the use of replicate analysis were developed, recommended, and utilized on TPA-1 reports.
 - d. Taxonomy development, as described earlier and in Attachment J, assisted with recording information about prerequisite competencies. The motor skills rating portion of the taxonomy was a late development that was added to the TPA-1 report.
3. As the analysis effort progressed, techniques employed generated data which were not originally envisioned. The types of data were as follows:
 - a. Discrepancies which are differences between job requirements in the field as identified by SME's and doctrine and procedures included in the FM's, TM's, AR's, or resident training.

- b. General comments which are pertinent observations of the analyst and/or qualifying statements of the SME.
- c. Job aid designations as intrinsic or resource and appropriate printing on TPA-2 reports.
- d. Designating procedures as "not taught" on TPA-2 reports.
- e. Highlighting decision points on TPA-2 reports.

The major operational decisions and/or considerations listed above serve to demonstrate the research and development nature of the analysis process. As analysis progressed new problems, issues, or discoveries required that decisions be made to accommodate the data which were being collected or which could be collected. The decisions were often made by the process of recommendation, review, and affirmation between the contractor and Government. At all times resources were considered as part of the decision-making process.

The considerations listed above were primarily involved in deriving the formats for analysis results and profiles. However, as shown on the listing of reports at the beginning of this attachment and on figures 1 and 2, ten summary (additional) reports associated with the analysis results were produced. Each report is directly derived from portion(s) of the analysis results. Major operational decisions and/or considerations associated with deriving the formats for the summary reports are as follows:

1. Modification P00001 called for use of the most recent task list or Soldier's Manual as the basis for analysis and that the document be available within 10 days of the analysis start date. This process helped ensure that analysis results were current and relevant. It also meant that most task lists or Soldier's Manuals were changed during the term of the project. The Task Statement Lists provide an historical record of the tasks actually analyzed. The Complete Task Statement List (for all MOS) also shows shared tasks.
2. Subtask utilization was described earlier. The Subtask Statement Lists provide one indication of the amount of overlap between tasks in various MOS. Obviously the shared task information described above provides another indication.
3. The Discrepancy Statement List provides a summary of the major variance resulting from the validation. It is more usable as a result of being extracted from the analysis results.
4. Early in the analysis process SME's were asked to provide input on prerequisite competencies. After the elaborated taxonomy was developed the SME's responses were structured in terms of the taxonomy. The Knowledge Statement Report captures the responses of SME to open-ended interview questions about prerequisite skills and knowledges.
5. As a result of the instructional review process various procedural portions of tasks were being designated as "not taught." To highlight these results and to provide a basis for an action report, such statements were labeled technical prerequisites and extracted from the TPA-2 reports.

- c. As the taxonomy was being developed a choice was made to have the statements be as representative as possible of the actual prerequisite skill involved. Consequently, much of the potential MOS or job specific nature of the statements was suppressed. To highlight the technical context for the prerequisite competencies for the various MOS, the prerequisite competency indicator statement list was developed. It should prove to be a valuable document for any subsequent curriculum development.
7. The Matrix of Prerequisites provides an indication of the degree of sharing of prerequisite competencies across MOS.

It should be noted that most summary reports are divided into BSEP I and BSEP II segments. This segmentation addresses a need expressed by the Government concerning follow-on curricula development efforts.

Date File Maintenance and Recommendations

Date files and system documentation descriptions were provided as part of the effort associated with producing data tapes in accordance with Modification P00007. The following major considerations and/or recommendations are associated with data file utilization and update (maintenance):

1. It could be assumed that one major use of the analysis results is to contribute to the various training development activities at TRADOC installations. As such, there would be a need to retrieve and print analysis results. Revisions may then be needed via input of new data or editing of data files. Retrieval and printing must be accomplished with consideration for replicate tasks, duplicate tasks, subtasks, and cross references. In other words, various files must be accessed to ensure complete coverage for a given MOS. As described in the system documentation, various conventions have been utilized so that replicates, duplicates, subtasks, and cross references can be identified and accessed. Provided frequency of usability and resources available would warrant it, the following changes in data files could be made to provide for ease of access for MOS analysis results:
 - a. Complete results for replicate tasks could be entered (TPA-2 file created) for each MOS for which the results apply. (Currently complete results are contained only in the "parent MOS," unless major changes were made as the result of the replicate analysis process.) The convention for noting replicate analysis should be maintained on the TPA-1 report.
 - b. In cases where there is complete duplication of tasks and there is currently only a TPA-1 file, complete results for the duplicate task(s) could be entered (TPA-2 file created) as applicable. The convention for noting duplicate tasks should be maintained on the TPA-1 report.
 - c. In cases where a portion of a task is duplicated or where cross references are included in the analysis results, the TPA-2 files could be edited to include the information covered by the duplicate or cross reference notation. The editing would remove any notation for duplicates on the TPA-1 report and any notation for cross references on the TPA-2 report.

- d. Because of the potential usability in future analysis efforts no changes are recommended for handling subtasks.
 - e. In accordance with Modification P00005, replicate analysis procedures were not utilized for approximately 150 tasks. Such tasks are identified by a notation in the "Comments" section of the TPA-1 report. By using procedures described in "a" above, TPA-2 files could be created.
2. Currently there are analysis results for 24 MOS formatted to include TPA-1, TPA-2, and TPA-3 with prerequisite competency codes shown on TPA-2. All results could be made parimonious via the following procedures:
- a. For the 24 MOS SME's and analysts should review th TPA-3 and knowledge analysis. All information on these reports which can be accommodated should be coded directly on the TPA-2 report using codes from the elaborated taxonomy. Any information which can not be accommodated, should be retained on TPA-3.
 - b. Likewise for the 24 MOS, SME's and analysts should review the TPA-2 reports and enter prerequisite competency codes from the elaborated taxonomy directly on the TPA-2 reports.
 - c. Files should then be edited in accordance with changes.
 - d. It is estimated that this procedure would take approximately 1.5 hours per task (3 person hours total).
3. The above mentioned assumptions and/or considerations focus on areas of concern that have become readily apparent as a result of attempting to utilize or faster utilization of analysis results by the Government. Other considerations are less apparent or unknown. Accordingly, the following general recommendation is made:
- a. Decide if an automated system for analysis results should be maintained and expanded. A study of potential usability may be appropriate.
 - b. Assuming the decision is to maintain and expand the system, identify and prepare to assign personnel. Based on the types of personnel needed to develop the system and the potential for expansion and utilization beyond the parameters in effect on the project, consideration should be given to the following categories of personnel: management with expertise in training and analysis (comparable to the C OR for the project); systems analyst, programmer, input clerks, editors, and analysts (at field locations).

Assistance in Developing Programs, Documentation, and Demonstration of System

Fortran programs were written when the process required that the data be selected, formatted, or otherwise manipulated in a manner beyond the capabilities of in-house utilities or editors. Fortran programs have been delivered that extract discrepancies from TPA-1 data files, print TPA-3 reports,

and print TPA-2 reports while creating PC codes, PC indicator statements, and technical prerequisite statement files. Other Fortran programs were developed to o, for example, sort TPA-1 data files, create input to cluster procedures, and put headings on MOS profile reports.

Most of our data processing effort--input, editing, and some report generation--used the in-house IBM CMS utilities, XEDIT and EXEC2. Because most of the input was unique, and because the project represented a one-time effort, no programming effort was expended in providing for internal editing, validation, or updating.

A data base management system (DBMS) was considered and used on some of the initial analysis data. Because (1) the nature of the data made it difficult to define fields, (2) the files were not to be updated, (3) the DBMS required an excessive amount of core storage, (4) its editor was most "unfriendly," and (5) the files created would not be readily transferrable to another installation, we chose to work with "flat" files.

The System Documentation (21 Oct 83) records our data entry rules, file naming conventions and other pertinent static information of the project data system. Procedures were in place throughout the project term to direct and control the flow of analysis data--from the field to final print. On 26 Jan 82, copies of the following procedures were sent to TRADOC:

- Maintaining the control file
- Field analysis
- Adding subtasks to the Index
- Accessing subtask files
- Processing ETAPs at the home office

A procedure for field entry of ETAPs and subtasks was developed, as required by the contract, and because of time, cost, and control considerations, was replaced with home office entry.

Procedures were also written and instruction given to field analysts on the use of their terminals and RCA's electronic mail (MEMO) system.

Specific instructions for entry clerks for each ETAP form were developed and changed as required. From Sep 81 through Feb 83, four entry clerks worked full-time in this office. During the period 24 Aug 82 through 21 Dec 82, as many as 14 temporary clerks entered ETAPs in a second-shift operation. The instructions provided entry clerks could never have been all-inclusive because of the combinations of variables among MOS, SMEs, tasks, and analysts. To make decisions about the exceptions, entry clerks were instructed to ask questions of the home office staff. To provide similar coverage to the second-shift operation, one of the staff was present during the first 28 sessions. Thereafter, clerks were instructed to enter x's where words were not clear or to refer tasks to the first shift for entry.

Control files listing the task numbers and task statements for each MOS were developed both manually and in the computer. These were noted as tasks were received, reviewed, and entered. All analysis data entered was printed for editing. In the case of TPA-2 files, a program was written to print the reports using double spacing and eliminating the "JID" symbols. Editors made the

required changes to the data files and renamed the files with an "X" following the file name in the computer. In this way, we could instruct the machine to identify the status of files entered so we would know when to produce the "final print" for one of the MOS.

The first assignment of the computer was to organize the 15,000 task numbers and statements that had been recorded on 3 x 5 cards. Using an outside service bureau, the 3 x 5's were entered onto magnetic tape, read into RCA's computer, sorted and printed to identify duplicates. This effort reduced by half, the expected number of tasks to analyze.

Following much preliminary discussion concerning computers, operating systems, tape density, etc., in May 83, BSEP analysis data, programs, and supporting files were delivered to TRADOC c/o ARI. On 24 and 25 May 83, the project systems analyst and the project programmer met with Mr. Richard Scott of Ari at NIH, Bethesda, MD to load and manipulate the data on the NIH computer system. With assistance from Mr. Laurie Wise, ARI, we created job streams and compiled Fortran programs to print reports. On the afternoon of 26 May, we successfully demonstrated the system at ARI, Alexandria, VA, using remote connection to NIH.

While the documentation that we presented with the tapes was complete in terms of listing the files, their size and location, it was not as detailed, nor as helpful, as the System Documentation delivered in October. It would have been beneficial if someone had become more familiar with the project and its data system before attempting to deal with the 2.9 million records in 1340 files plus 317 files of programs and documentation. Our recommendation for the demonstration was to load a few files and their pertinent programs onto the system to test the operation of the data and programs on the NIH Installation. Work was in progress loading all files that we had sent earlier. We were unable to proceed with our plan until our second day at the site.

We had made errors on our initial documentation, and had put certain files on the tape out of order. Two replacement tapes were sent in July. We have heard of no other problems.

ATTACHMENT L

Complete Subtask Index

[illegible]

EC	* * * ELECTRONIC COMMUNICATIONS DEVICES * *			
EC01	DIGITAL MESSAGE DEVICE, (PSG-2A), ATTACH POWER	1-A-E	13F	0612731001
EC09	DIGITAL MESSAGE DEVICE, CHECK POWER FAILURE	1-A-B	13F	0612731007
EC08	DIGITAL MESSAGE DEVICE, CLEAN BATTERY COMPARTMENT	2-A-D	13F	0612731006
EC07	DIGITAL MESSAGE DEVICE, CLEAN EXTERIOR	1-A-D	13F	0612731006
EC02	DIGITAL MESSAGE DEVICE, CONNECT AUDIO CABLES	2-A-E	13F	0612731001
EC04	DIGITAL MESSAGE DEVICE, CORRECT ERRORS	3-A	13F	0612731003
EC03	DIGITAL MESSAGE DEVICE, ENTER MISSION DATA	2-A-C	13F	0612731003
EC05	DIGITAL MESSAGE DEVICE, TRANSMIT DATA	3-B	13F	0612731003
EC06	DIGITAL MESSAGE DEVICE, TRANSMIT FIRE ADJUSTMENTS	4-A-D	13F	0612731003
EC14	PRINTER, ELECTRONIC LINE, CLEAN	3-A-M	13F	0612731013
EC13	PRINTER, ELECTRONIC LINE, CLOSE	4-A-I	13F	0612731011
EC12	PRINTER, ELECTRONIC LINE, FEED PAPER	3-A-F	13F	0612731011
EC11	PRINTER, ELECTRONIC LINE, LOAD PAPER	2-A-G	13F	0612731011
EC10	PRINTER, ELECTRONIC LINE, OPEN UP	1-A-F	13F	0612731011
EC15	VARIABLE FORMAT MESSAGE ENTRY DEVICE, CLEAN	2-A-C	13F	0612731013
EC				
EU	* * * EQUIPMENT USE * * *	TASK		
EU15	BATTERY CHARGER, PD4127/U, SERVICE, PMCS	TASK	17K	3013411515
EU14	BATTERY, BB-643/U, SERVICE PMCS	TASK	17K	3013411516
EU18	CHECK/TEST SWITCH/REPLY CNIC FOR CONT W MULTIMETER		45K	
EU07	DEPTH GAGE, INSPECT FOR GOUGES/SCRATCHES	7-B	45K	5517561064
EU23	DESOLDER LEADS		45K	
EU02	FIRE EXTINGUISHERS, EXTINGUISH FIRE WITH	3	19D	1711211003
EU01	FIRE EXTINGUISHERS, REMOVE FROM BRACKET	2	19D	1711211003
EU04	INSTALLS REPLACEMENT ELECTRICAL COMPONENTS		45K	
EU09	MICROPHONE SLEEVING, OPERATE, LOCATE DATA	6-H	27E	0934111309
EU09	MICROMETER, OUTSIDE, USAGE	1-3	76C	1015391101
EU08	MULTIMETER, CHK FOR CALIBRATION DATE, DAMAGE	3-E-2	63W	0914802028
EU11	MULTIMETER, CONTINUITY TEST	2-B1-2	63N	0914841048
EU10	MULTIMETER, DC VOLTAGE TEST	1-E	63W	0914802023
EU13	MULTIMETER, MAINTAIN TS 352 B/V	1-C	63W	0914802023
EU21	MULTIMETER, MEASURE DC VOLTAGE (TS352 B/V)	TASK	17K	3013411303
EU22	MULTIMETER, MEASURE DC VOLTAGE (TS352 B/V)	1-2	17K	3013411306
EU12	MULTIMETER, MEASURE RESISTANCE (TS-352 B/V)	1-3	17K	3013411307
EU17	SET UP MULTIMETER TO CHECK RESISTANCE/CONTINUITY	2-D	63N	0914841048
EU25	SOLDERS LEADS		45K	
EU03	TORQUE WRENCH, USE OF	5-D, 1-12	45K	
EU16	USING VERNIER CALIPER AND WEAR LIMITS TABLE		63W	0914801238
EU04	WINCH, (M911 TRUCK), DETERM. MECHANICAL ADVANT.	3-A-B	45K	
EU05	WINCH, (M911), CONNECT TO DISABLED VEHICLE	4-F	63W	0914991917
EU06	WINCH, (M911), SHUTDOWN OPERATIONS	5-A-D	63W	0914991917
EX	* * * EXPLOSIVES * * *			
EX	PLASTING CAP, CONNECT TO FUSE	2-A-B	15D	0612835002
EX	PLASTING FUSE, DETERMINE LENGTH, TIME	1-A-D	15D	0612856002
EX				
EX	* * * FORMS * * *			
EX	COMPLETE DA FORM 2407, MAINTENANCE REQUEST	TASK	25Q	1136231003
EX	COMPLETE DA FORM 672 FOR SECURITY CONTAINER	1-C	95B	3013421017
EX	COMPLETE DA FORM 727 FOR SECURITY CONTAINER	1-D	96B	3013461017
EX	COMPLETE DD FORM 123 FOR ELECTRONIC MESSAGE	1-E	21F	1210041205
EX	DA FORM 2100, USED FOR DIRECT EXCHANGE AND ID	5-D	24C	4410532661
EX	DA FORM 2100, PREPARE	1-F	269	1136231003

FORM DA FORM 3-65 - AVIATION REQUEST FORM	2-A-B	67U 5517651024
FORM DD FORM 314 (SCHEDULED & PERFORMED MAINTENANCE)	1-A-K	26Q 1136233004
FORM 3-65 DETERMINE A JULIAN DATE	1-B	26Q 1136233003
FORM 3-65 AIRCRAFT FRAGMENTARY ORDERS, DD FORM 173	2-A-D	96B 3013562205
FORM 3-65 FORM COMPLETION DA FORM 1150	1-A-E	19D 1711231003
FORM 3-65 FORM COMPLETION DA FORM 2012	1-A-F	19D 1711231003
FORM 3-65 FORM COMPLETION DA FORM 2404	2-A-G	17L 5013511309
FORM 3-65 FORM COMPLETION DA FORM 2403-1	2-A-H	19D 1711231023
FORM 3-65 FORM COMPLETION DA FORM 2408-12	2-A-I	27U 5517651010
FORM 3-65 FORM COMPLETION DA FORM 2408-13	2-A-J	67U 5517651011
FORM 3-65 FORM COMPLETION DA FORM 2408-14	3-A-K	67U 5517651012
FORM 3-65 FORM COMPLETION DA FORM 2408-15	3-A-L	57U 5517652007
FORM 3-65 FORM COMPLETION DA FORM 2408-18	3-A-M	67U 5517651015
FORM 3-65 FORM COMPLETION DA FORM 2445	4-9	71L 1210041223
FORM 3-65 FORM COMPLETION DA FORM 2496	2-A-B	71L 1210041201
FORM 3-65 FORM COMPLETION DA FORM 4569	9-A-H	71L 1210041207
FORM 3-65 FORM COMPLETION DD FORM 1970	2-A-H	63C 0914991912
FORM 3-65 FORM COMPLETION, DA FORM 2402	2-A-I	67U 5517651007
FORM 3-65 FORM INSPECTION COMPLETED DA FORM 2404	3-A-B	36C 1135947003
FORM 3-65 NATIONAL STOCK NUMBER, ALL INFORMATION IN USE	9-C	24C 4410536261
FORM 3-65 PM CHECKLIST, (HELICOPTER), UPDATE	1-D	67U 5517651064
FORM 3-65 PROC USE OF TAB, PERFORM P.M. CHKS SERV OF SPEC TASKS		13E 0612811000
GP		
GP		
GN054 POSITIONING AND SET-UP, DIRECT	1-A-M	26Q 1136017033
GN054 PU422/UCIP5-33A, SERVICE GENERATOR SET	TASK	1-K 3013411410
GN054 PUS32/PPS-4, SERVICE GENERATOR SET	TASK	17K 3013411410
GN124 10KW, MEP-018A, MEP-023A, INSTALL	1-3	26Q 1136011002
GN134 10KW, MEP-018A, MEP-023A, OPERATE	1-7	26Q 1136012003
GN134 10KW, MEP-018A, MEP-023A, PERFORM PMCS	1-11	26Q 1136013002
GN044 15KW, PV-405/G, PERFORM DAILY PM	1-A-C	26Q 1136013007
GN034 15KW, PV-405/G, START AND APPLY LOAD	2-A-EE	26Q 1136012012
GN034 3KW (28VDC), PU-615G OR PU-628G, INSTALL	1-3	26Q 1136011006
GN034 3KW (28VDC), PU-615G OR PU-628G, OPERATE	1-5	26Q 1136012009
GN034 3KW, MEP-016A, -021A, PM CHECKS	1-A-E	43M 1015131106
GN034 3KW, MEP-016A, -021A, START	2-A-G	26Q 1136011001
GN114 5KW, MEP-017A, MEP-022A, INSTALL	1-3	26Q 1136011001
GN094 5KW, MEP-017A, MEP-022A, OPERATE	1-6	26Q 1136012001
GN144 5KW, MEP-017A, MEP-022A, PERFORM PMCS	1-8	26Q 1136013001
GP		
GP		
GP08 FIBERGLASS, APPLY PATCHES	6-A-G	68G 5517531047
GP06 FIBERGLASS, MAJOR CORE DAMAGE, REPAIR	4-A-O	68G 5517531046
GP05 FIBERGLASS, MINOR CORE DAMAGE, REPAIR	3-A-K	68G 5517531046
GP09 FIBERGLASS, PREPARE BLADE FOR REPAIR	4-A-M	68G 5517532058
GP07 FIBERGLASS, PREPARE SURFACE FOR REPAIR	3-A-C	68G 5517531047
GP04 FIBERGLASS, SKIN DELAMINATIONS, REPAIR	2-A-K	68G 5517531046
GP02 GLASS, MAKE PATTERN TO CUT GLASS FOR REPLACEMENT	2-A-C	44B 0914681080
GP01 GLASS, REMOVE FROM FRAME	1-A-D	44B 0914681080
CP03 PLASTIC, CUT FOR REPLACEMENT PURPOSES	4-A-C	44B 0914681080
LA		
LA		
LA02 ADJUST CROSS-SLIDE COMPOUND/GIDS	6-A-C	44E 0914691050
LA03 ALIGN CENTERS	7-A-J	44E 0914691050
LA19 BORE CUT, FINISHING PERFORM	8-A-E	44E 0914691061

LA04	COMPUTE SPINDLE SPEED	1.A-E	0914691055	44F
LA27	CUTTER BIT MOUNT IN TOOL HOLDER	5.A-G	0914691065	44E
LA25	EXTERNAL THREADS, FINISH CUT	7.A-M	0914691064	44E
LA24	EXTERNAL THREADS, TRIAL CUT	6.A-H	0914691064	44E
LA23	EXTERNAL THREADS, DETERMINE DIMENSION	1.A-C	0914691064	44E
LA05	FACING TOOL, MOUNT & ADJUST	4.A-G	0914691055	44E
LA06	FINISHING CUT, SET FEED & DEPTH	6.A-F	0914691055	44E
LA16	GROOVING CUTTER, MOUNT & ADJUST	4.A-G	0914691060	44E
LA17	GROOVING, MACHINE WORK PIECE	5.A-I	0914691060	44E
LA28	INTERNAL THREADS, FINISH CUT	8.A-D	0914691065	44E
LA26	INTERNAL THREADS, TRIAL CUT	7.A-I	0914691065	44E
LA01	LUBRICATE	1.A-H	0914691050	44E
LA05	MOUNT WORKHOLDING DEVICE	2.A-G	0914691055	44E
LA14	PARTING TOOL, MOUNT & ADJUST	4.A-H	0914691059	44E
LA15	PARTING TOOL, PERFORM CUT	5.A-D	0914691059	44E
LA07	ROUGH CUT (FACE), SET FEED & DEPTH	5.A-G	0914691055	44E
LA12	ROUGH CUT (SHOULDER TURN), SET FEED & DEPTH	6.A-H	0914691058	44E
LA13	ROUGH CUT (STRAIGHT TURN), SET FEED & DEPTH	6.A-G	0914691057	44E
LA18	ROUTING BORE, PERFORM	7.A-E	0914691061	44E
LA20	TAPER ATTACHMENT, SET UP	2.A-E	0914691062	44E
LA21	TAPERING, MAKE TRIAL ROUGH CUT	6.A-D	0914691062	44E
LA22	TAPERING, COMPOUND REST METHOD	10.A-H	0914691062	44E
LA11	TOOL & MACHINE MAINTENANCE, PERFORM	9.A-F	0914691057	44E
LA10	TOOL BIT & HOLDER, MOUNT	5.A-D	0914691057	44E
LN				
LN				
LN03	JACK SUPPORTS, LOWER (LANCE)	* * * * LAUNCHER * * * *		
LN04	MISSILE, TRANSFER TO LAUNCHER (LANCE)	3.A-E	0612851060	15D
LN07	SELF PROPELLED, CHARGE BATTERY	4.A-D	0612851070	15D
LN06	SELF-PROPELLED, CLEAN AND INSPECT RATTERY	2.A-E	0612851520	15D
LN05	SELF-PROPELLED, CONVERT TO ZERO-LENGTH	1.A-E	0612851520	15D
LN01	SUSPENSION LOCKOUT, ENGAGE (LANCE)	1.A-C	0612851430	15D
LN02	TRUSS, ELEVATED (LANCE)	2.A-D	0612851020	15D
LT				
LT				
LT01	PREPARE (LANCE MISSILE)	1.A-E	0612851070	15D
MC				
MC				
MC07	ADJUST HEADSPACE ON THE CAL 50 M2 M81T MACHINEGUN	1.A-B	1711221047	19E
MC08	ADJUST TIMING ON THE CAL 50 M2 M81T MACHINEGUN	4.A-B	1711221047	19E
MC06	ASSEMBLE CAL 50 M2 M81T MACHINEGUN	2.A-G	1711221029	19E
MC04	ASSEMBLE CAL 50 M85 MACHINEGUN	4.A-I	1711221019	19E
MC02	ASSEMBLE M240 MACHINEGUN	4.A-E	1711221012	19E
MC05	DISASSEMBLE CAL 50 M2 M81T MACHINEGUN	2.A-G	1711221019	19E
MC03	DISASSEMBLE CAL 50 M85 MACHINEGUN	2.A-G	1711221018	19E
MC01	DISASSEMBLE M240 MACHINEGUN	2.A-I	1711221012	19E
MC10	ENG TARG VEH TOW CAL 50 M2 HP M08G M551/M113-M48A5	2.A-E	1711221036	19D
MC09	ENG TARG VEH TOW CAL 50 M2 HP M08G M551/M113-M48A5	4.A-B	1711221036	19D
MC11	M40 MACHINEGUN, DISASSEMBLE	1.A-B	0713123005	11D
MC14	M40 MACHINEGUN, ASSEMBLE	4.A-B	0713123005	11D
MC12	M50 MACHINEGUN, IN RECI AMM-NITION	5.A-E	0713123005	11D
MC13	M50 MACHINEGUN, LUBRICATE	3.A-D	0713123005	11D
MC15	M40 MACHINEGUN, CLEAN	2.A	0712125195	11D
MC16	M40 MACHINEGUN, IN RECI AMM-NITION			
MC17	M40 MACHINEGUN, IN RECI AMM-NITION			
MC18	M40 MACHINEGUN, IN RECI AMM-NITION			
MC19	M40 MACHINEGUN, IN RECI AMM-NITION			
MC20	M40 MACHINEGUN, IN RECI AMM-NITION			
MC21	M40 MACHINEGUN, IN RECI AMM-NITION			
MC22	M40 MACHINEGUN, IN RECI AMM-NITION			
MC23	M40 MACHINEGUN, IN RECI AMM-NITION			
MC24	M40 MACHINEGUN, IN RECI AMM-NITION			
MC25	M40 MACHINEGUN, IN RECI AMM-NITION			
MC26	M40 MACHINEGUN, IN RECI AMM-NITION			
MC27	M40 MACHINEGUN, IN RECI AMM-NITION			
MC28	M40 MACHINEGUN, IN RECI AMM-NITION			
MC29	M40 MACHINEGUN, IN RECI AMM-NITION			
MC30	M40 MACHINEGUN, IN RECI AMM-NITION			
MC31	M40 MACHINEGUN, IN RECI AMM-NITION			
MC32	M40 MACHINEGUN, IN RECI AMM-NITION			
MC33	M40 MACHINEGUN, IN RECI AMM-NITION			
MC34	M40 MACHINEGUN, IN RECI AMM-NITION			
MC35	M40 MACHINEGUN, IN RECI AMM-NITION			
MC36	M40 MACHINEGUN, IN RECI AMM-NITION			
MC37	M40 MACHINEGUN, IN RECI AMM-NITION			
MC38	M40 MACHINEGUN, IN RECI AMM-NITION			
MC39	M40 MACHINEGUN, IN RECI AMM-NITION			
MC40	M40 MACHINEGUN, IN RECI AMM-NITION</			

M104 CLOSE INTELLIGENCE JOURNAL FILE			
M144 COLLECT TARGET DATA FROM INTELLIGENCE HOLDINGS	4.	96B	3013361302
M16*CONTROL OF KEYS ON SECURITY CONTAINER	1.B	96B	3013362635
M107*CONVERT AZIMUTH TO BACK AZIMUTH	2.	96B	301336X107
M105*CONVERT AZIMUTHS. MAGNETIC OR GRID	TASK	96B	0713291010
M140*CREATE A TARGET FILE	2.	96B	0713291029
M150 DEBRIEF PATROL MEMBERS	2.	96B	3013362605
M114 DECODE MESSAGE USING KTC 600 TACTICAL OPS. CODE	2.	96B	3013362702
M155 DELIVER INTELLIGENCE BRIEFING	3.	96B	112534001
M112*DESTROY CLASSIFIED MATERIAL	2.C	96B	3013361505
M104*DETERMINE ELEVATION OF A POINT ON A MAP	1.	96B	301336X107
M101*DETERMINE MAP SCALE	1.A	96B	0713291014
M133*DETERMINE MILITARY ASPECTS OF TERRAIN	1.B	96B	2512033501
M135*DETERMINE MILITARY ASPECTS OF WEATHER	2.	96B	3013361604
M106*DETM. ACCURACY AND RELIABILITY OF INCOMING INFO.	2.	96B	3013361404
M109*DETM. GRID COORDINATES OF A POINT	1.	96B	2013362301
M139*DISTRIBUTE MESSAGE BY MAIL OR COURIER	1.D.	96B	0713291014
M138 DISTRIBUTE MESSAGE BY SECURE VOICE PHONE	2.C	96B	3013361507
M146 DRAFT AN INTELLIGENCE REPORT	2.A	96B	3013361507
M113*ENCODE MESSAGE USING KTC 600 TACTICAL OPS. CODE	1.	96B	3013362501
M125*ENTER INFORMATION ON SIT MAP	2.	96B	1125236001
M132 EXTRACT INFORMATION FROM ORDER OF BATTLE FILES	1.A	96B	3013361303
M117*HANDLE CLASSIFIED DOCUMENTS	2.A	96B	3013361101
M110*LOC. POINT ON MAP BY INTERSECTION WITHOUT COMPASS	2.B	96B	301336X107
M111*LOC. POINT ON MAP BY RESECTION WITH COMPASS	2.A-E.	96B	301336X107
M112*LOC. POINT ON MAP BY RESECTION WITHOUT COMPASS	1.	11B	0713291014
M103*LOCATE A POINT OF THE MAP USING COORDINATE SCALE	2.	96B	0713291014
M108*LOCATE POINT ON MAP BY INTERSECTION WITH COMPASS	1.A-E.	96B	0713291034
M140 MAINTAIN COLLECTION WORKSHEET	TASK	96B	11R 0713291014
M123 MAINTAIN INTELLIGENCE JOURNAL FILE	3.	96B	3013362204
M147 MAKE FINAL COPY OF INTELLIGENCE REPORT	2.B	96B	3013361302
M130 PREPARE A PERSONALITY FILE	1.B	96B	3013362501
M142 PREPARE ACQ. REQUESTS TO HIGHER OR ADJACENT UNITS	2.B	96B	3013361305
M141 PREPARE ACQUISITION ORDERS TO SUBORDINATE UNITS	2.A	96B	3013362207
M129 PREPARE AN ORDER OF BATTLE CARD	1.	96B	3013362207
M137 PREPARE BRIEFING FOLLOW-UP	4.	96B	3013361305
M135 PREPARE INTELLIGENCE BRIEFING	1.-2	96B	3013361505
M127 PREPARE ORDER OF BATTLE WORKBOOK	1.	96B	3013361505
M148 PREPARE THE INTELLIGENCE ESTIMATE REPORT	TASK	96B	3013361304
M122*RECEIVE CLASSIFIED DOCUMENTS	1.	96B	3013362502
M126 REPLACE OVERLAY ON MAP	1.B	96B	3013361101
M120*SECURE CLASSIFIED MATERIAL	3.	96B	3013361303
M102*USE AN ARMY MAP CATALOG	TASK	96B	301336X107
M128 USE AN ORDER OF BATTLE WORKBOOK	2.	96B	051203X502
M115*USE COMBINATION LOCK ON SECURITY CONTAINER	1.A.	96B	3013361304
M121*USE MARGINAL INFORMATION ON MAP	TASK	96B	301336X107
MP		96B	3013361004
MP			
MP10* SIGNAL CONVERTER (TD-202), TROUBLESHOOT	2.A-SSSS	26L	1136060036
MP20 TD-204/U, ALIGN	3.A-JJ	26L	1136060006
MP01 TD-204/U, TROUBLESHOOT	2.A-P	26L	1136060006
MP12*TD-351/U, OPERATIONAL CHECK	3.A-PP	26Q	1135932007

* * * * MULTIPLEXER * * * *

MP05 TD-352/U, CA CODER ADJUSTMENT 5. A-FEFF 26L 1136060009
 MP04 TD-352/U, CCL ADJUSTMENT 4. A-EE 26L 1136060009
 MP03 TD-352/U, TROUBLESHOOT 2. A-Q 26L 1136060009
 MP09 TD-660/AG, CODER ADJUSTMENT 5. A-QG 26L 1136060015
 MP08 TD-660/AG, PAM LEVEL ADJUSTMENT 4. A-Q 26L 1136060015
 MP07 TD-660/AG, PCM OUT-TMC OUT PHASE ADJUSTMENT 3. A-V 26L 1136060015
 MP06 TD-660/AG, TROUBLESHOOT 2. A-NN 26L 1136060015
 MR

* * * 4 METAL REPAIR * * *

MR20 AIR-TEST, UNDERWATER, CHECKING FOR LEAKS 2. A-E 44B 0914681100
 MR15 ARC WELDER SET UP AND OPERATE 3. A-E 44B 0914681060
 MR42 BASTARD FILE, PROPER FILING METHOD 3. A-D 44E 0914691004
 MR34 BIT, DRILL, PORTABLE, SELECT, INSTALL AND ADJUST 3-4 44B 0914681213
 MR27 COMPRESSOR, AIR, SET UP BEFORE OPERATING 1. B 44B 0914681190
 MR30 COMPRESSOR, AIR, GAS POWERED, PREOPERATION CHKS 5. A-E 44B 0914681190
 MR24 FILE, SELECTION, USE DIRECTIONS 1. A-B 44B 0914681160
 MR21 FLOW-TEST, RATE OF WATER FLOW, RADIATOR ETC. 1. A-H 44B 0914681121
 MR33 GRINDER, INSPECT AND SET-UP MACHINE 1. A-I 44B 0914681212
 MR40 HACKSAW, MOUNT BLADE 3. A 44E 0914691003
 MR41 HACKSAW, PROPER SAWING METHOD 6. A-F 44E 0914691003
 MR39 HACKSAW, SELECT PROPER BLADE 2. A 44E 0914691003
 MR43 HELI-COIL INSERTS, DETERMINE HOLE SIZE 1. A-D 44E 0914691009
 MR44 HELI-COIL, INSERT ASSEMBLY 6. A 44E 0914691009
 MR25 JACK HYDRAULIC, INSPECT AND PROVIDE MAINTENANCE 2. A-E 44B 0914681161
 MR10 LIBBY ARC WELDER, SET UP 1. A 44B 0914681020
 MR11 LIBBY ARC WELDER, START, ADJUST VOLTAGE/CURRENT 3. A-C 44B 0914681020
 MR06 MATERIAL, CUTTING PROCEDURE USING A TORCH 5. A-H 44B 0914681066
 MR05 METAL WELD, ALINE AND TACK 7. B-C 44B 0914681005
 MR03 METAL, CLEANING AND PREPARING FOR WELDING 4. A 44B 0914681009
 MR02 METAL, FERROUS OR NONFERROUS TESTING 1. A 44B 0914681037
 MR14 MIG WELDING, SET UP EQUIPMENT 4. A-E 44B 0914681040
 MR04 OXYACETYLENE WELD, EQUIPMENT SHUT-DOWN 3. A 44B 0914681001
 MR03 OXYGEN, ACETYLENE, ADJUST PRESSURE TO WELD 11. A-F 44B 0914681001
 MR28 PAINTS AND PRIMER, MIXING, THINNING AND STRAINING 5. A-D 44B 0914681001
 MR13 PIPE CUT, BEVEL-CLEAN WITH OXYACETYLENE TORCH 2. A-C 44B 0914681190
 MR45 RESPIRATOR, CARE OF 3. A-C 44B 0914681022
 8. G 44B 0914681190
 1-3 44B 0914681158
 MR22 SANDER, HAND, SET-UP AND OPERATE DISC SANDER 1. A-B 44B 0914681159
 MR23 SANDPAPER, SELECTION AND PREPARATION FOR SANDING 2. A 44B 0914681100
 MR17 SOLDERING IRON, PREPARATION 6. A-D 44B 0914681190
 MR31 SPRAY GUN, OPERATING 1. A 44B 0914681190
 MR26 SPRAY GUN, SET-UP 44B 0914681190
 MR32 SPRAY PAINTING, EQUIPMENT SHUTDOWN PROCEDURES 8. A-E 44B 0914681190
 MR36 SUPERVISION, ASSEMBLY OF TOOLS AND MATERIALS 3. A-B 44B 0914682040
 MR37 SUPERVISION, EVALUATION OF LEVEL AND PROGRESS 4. A-D 44B 0914682040
 MR35 SUPERVISION, EVALUATION OF SUBORDINATE 1-2 44B 0914682040
 MR38 SUPERVISION, INSPECTION OF COMPLETED WORK 5. A-C 44B 0914682040
 MR29 SURFACES METAL, PREPARATION FOR PAINTING 3. A-C 44B 0914681190
 MR19 SWEATING, JOINING METAL PIECES WITH SOLDER 6. A-F 44B 0914681100
 MR18 TIG WELDER, SET UP AND OPERATE 4. A-E 44B 0914681060
 MR18 THINNING, PREPARING AN AREA FOR METAL PATCH 5. A-D 44B 0914681100
 MR02 TIP, WELDING, SELECT AND INSTALL 4. A-B 44B 0914681001
 MR12 WELD INSPECTION OF EQUIPMENT 5. A 44B 0914681020
 MR09 WELDING TORCH, LIGHT AND ADJUST 5. A 44B 0914681009

MS	MS03 CONTROL SURFACES (LANCE), INSTALL	1-A-C	15D	0612851200
	MS04 CONTROL SURFACES (LANCE), REMOVE	2-A-C	15D	0612851200
	MS01 UMBILICAL CABLE (LANCE) CONNECT	2-A-E	15D	0612351120
	MS07 VAPOR LEAKS, CONDUCT CHECK	2-A-E	15D	0612851300
	MS06 VAPOR LEAKS, DON PROTECTIVE GEAR	1-A-F	15D	0612851300
	MS09 WARHEAD (LANCE), DEMATE FROM MISSILE	3-A-J	15D	0612851920
	MS03 WARHEAD (LANCE), MATE TO MAIN ASSEMBLY	3-A-E	15D	0612851380
	MS05 WARHEAD (LANCE), MISSILE-ROUND CHECKOUT	2-A-C	15D	0612851220
	MS02 WARHEAD (LANCE), PERFORM MISFIRE PROCEDURES	1-A-J	15D	0612851160
NI				
N	NAUTICAL OPERATION			
NI08	ANCHOR, PREPARE TO (LCM-8)	1-A-B	61B	5517362531
NI07	DISTRESS SCENE, TAKE ACTION	3-A-F	61B	5517352301
NI05	DISTRESS SIGNALS, RECOGNIZE	1-A-C	61B	5517352301
NI06	DISTRESS SIGNALS, RESPOND TO	2-A-D	61B	5517352301
NI04	DOCK ALONGSIDE SHIP	3-A-H	61B	5517342310
NI03	DOCK ALONGSIDE SHIP, PREPARE TO	2-A-D	61B	5517342310
NI01	SURF OR SHALLOW WATER, PREPARE TO ENTER	1-A-G	61B	5517342309
NI02	SURF OR SHALLOW WATER, ENTER	2-A-C	61B	5517342309
RA				
RA	RADIO			
RA12	AN/GRC-103, RECEIVER, PERFORM CHECKS	1-A-H	26L	1135910067
RA13	AN/GRC-103, TRANSMITTER, PERFORM CHECKS	2-A-J	26L	1135910067
RA06	AN/GRC-143, FILAMENT VOLT. METER, CALIBRATE	2-A-AA	26L	1135915003
RA05	AN/GRC-143, PWR AMP BEAM VOLT METER, CALIBRATE	1-A-FF	26L	1135915003
RA08	AN/GRC-143, PWR AMP DC OVERLOAD TRIP PT, ADJUST	8-A-GG	26L	1135915003
RA07	AN/GRC-143, PWR AMP METERING CIRCUIT, CALIBRATE	6-A-III	26L	1135915003
RA11	AN/GRC-144, REFLECTED RF PWR METER, CALIBRATE	3-A-GG	26L	1135915004
RA09	AN/GRC-144, TRANSMIT METER 1A15ABM1, CALIBRATE	1-A-U	26L	1135915004
RA10	AN/GRC-144, TRANSMIT METER 1A16M2, CALIBRATE	2-A-AA	26L	1135915004
RA27	AN/GRC-50, TUNE TRANSMITTER	1-A-PPP	26L	1135913001
RA57	AN/TCC-38 GROUNDING OF CHASSIS	1-A-B	36C	1136037002
RA60	AN/TCC-38 PERF. CONTROL & SWITCH CHECK, FRONT PNL.	3-A-C	36C	1136037002
RA59	AN/TCC-38 PERFORM A LAMP TEST	3-A-B	36C	1136037002
RA58	AN/TCC-38 POWER CABLE CONNECTIONS	2-A-D	36C	1136037002
RA53	AN/TCC-60, 61, 69 ADJUST CHANNELS, TO 352	3-B	31M	1135932024
RA52	AN/TCC-60, 61, 69 PERF CABLE POWER CHKS, ALIGNMENT	3-A-L	31M	1135932024
RA22	AN/TCC-61, PERFORM DURING-OPERATION PM	1-A-D	26Q	1135933007
RA23	AN/TCC-61, PERFORM WEEKLY PM CHECKS	3-A-D	26Q	1135933007
RA26	AN/TCC-65, PERFORM EXTERIOR CHECKS	1-A-B	26Q	1135933020
RA21	AN/TCC-65, PERFORM OPERATIONAL CHECKS	3-A-B	26Q	1135933004
RA24	AN/TCC-73, PERFORM DURING-OPERATION PM	1-A-D	26Q	1135933012
RA25	AN/TCC-73, PERFORM WEEKLY PM CHECKS	3-A-Y	26Q	1135933012
RA36	AN/TRA-37, ASSEMBLE ANTENNA, WAVEGUIDE	4-A-R	26Q	1135911025
RA35	AN/TRA-37, ASSEMBLE GIN POLE	3-A-U	26Q	1135911025
RA34	AN/TRA-37, ASSEMBLE MASTS	2-A-U	26Q	1135911025
RA33	AN/TRA-37, BASEPLATE/ANCHORING LAYOUTS	1-A-J	26Q	1135911025
RA37	AN/TRA-37, RAISE ANTENNA	5-A-HH	26Q	1135911025
RA46	AN/TRC-106, ADJUST ANTENNA DIRECTION	5-A-O	26Q	1135912031
RA48	AN/TRC-106, ADJUST ORDERWIRE LEVEL	7-A-K	26Q	1135912031
RA47	AN/TRC-106, ADJUST TRAFFIC LEVELS	6-A-J	26Q	1135912031
RA45	AN/TRC-106, TUNE	3-A-M	26Q	1135912031
RA28	AN/TRC-112, GROUND SHELTER	1-A-K	26Q	1135911004
RA29	AN/TRC-112, PREPARE TO APPLY POWER	3-A-F	26Q	1135911004

RA15 AN/TRC-112, -121, DAILY PM, DIRECT	1-A-J	26Q	1135917012
RA16 AN/TRC-112, -121, MONTHLY PM, DIRECT	2-A-I	26Q	1135917012
RA17 AN/TRC-112, -121, QUARTERLY FM, DIRECT	3-A-I	26Q	1135917012
RA50 AN/TRC-117(V) PERFORM ORDERWIRE ADJUSTMENT	2-A-F	31M	1135932023
RA51 AN/TRC-117(V) PERFORM PCM ALIGNMENT	3-A-K	31M	1135932023
RA43 AN/TRC-138, ACTIVATE POWER SOURCE	2-A-K	26Q	1135912014
RA39 AN/TRC-138, ASSEMBLE ANTENNA, LAUNCHER	2-A-S	26Q	1135911026
RA40 AN/TRC-138, ATTACH FEEDHORN TO REFLECTOR	3-A-H	26Q	1135911026
RA41 AN/TRC-138, ATTACH GUY WIRES, RAISE LAUNCHER	4-A-L	26Q	1135911026
RA44 AN/TRC-138, CHECK FREQUENCIES	5-A-D	26Q	1135912014
RA32 AN/TRC-138, CONNECT VIDEO CABLES	4-A-B	26Q	1135911009
RA30 AN/TRC-138, CONNECT WAVEGUIDE TO SHELTER	2-A-F	26Q	1135911009
RA38 AN/TRC-138, POSITION GUY STAKES	1-A-E	26Q	1135911026
RA31 AN/TRC-138, PREPARE TO APPLY POWER	3-A-K	26Q	1135911009
RA42 AN/TRC-138, RAISE ANTENNA	5-A-BB	26Q	1135911026
RA49 ANTENNA, INSTALL RC292	1-4	05B	1135961018
RA04 ANTENNA, RADIO, 1729/VRC, ASSEMBLE AND ERECT	4-A-B	05B	1135871002
RA14 ANTENNAS, RADIO TERMINAL, DIRECT INSTALLATION	3-A-F	26Q	1135917011
RA01 MOUNT, RADIO(MT-1029), INSPECT AND CLEAN	1-B	05B	1135871002
RA03 MOUNT, RECEIVER(RADIO), MT-1898/VRC, INSPECT & CLEAN	2-B	05B	1135871002
RA18 RADIO REPEATER SETS, DAILY FM, DIRECT	1-A-C	26Q	1135917007
RA02 RADIO(AN/VR-12), INSTALL IN MOUNT	1-C	05B	1135871002
RA19 RADIO-REPEATER SETS, MONTHLY PM, DIRECT	2-A-C	26Q	1135917007
RA56 RL-31E, PREPARE REEL UNIT, GROUND USE	2-A-E	36C	113587037
PA55 SB-3514(V)ITT, CHECK ALL CABLE CONNECTIONS	2-A-B	36C	1135957010
RA54 SB-3614(V)ITT, CHECK PRINTED CIRCUIT BOARD (PCB)	1-A-C	36C	1135957010
RA62 SET TT-76 ()/GGC-ADJ, TRIP LATCH, LEV. DIS. CAM.	5-A-I	31J	1135980002
RA64 SET TT-76 ()/GGC-ADJUST PRINT MECHANISM	5-D	31J	1135980002
RA65 SET TT-76 ()/GGC-ADJUST TAPE FEED MECHANISM	5-E	31J	1135980002
RA51 SET TT-76 ()/GGC-CODE RING LOCKING BALL	5-AIG	31J	1135980002
RA63 SET TT-76 ()/GGC-STOP ARM, TYPE WHEEL ASSY, ALIGNED	5-C	31J	1135980002
RA20 TELEPHONE CIRCUIT LINES, CONNECT (AN/TCC-65)	3-A-B	26Q	1135931004
RD			
RD			
RD04 CWAR, POSITION CONTROLS BEFORE POWER ON	1-A-G	16E	4410521019
RD12 CWAR, RADAR FAIL LIGHTS, DAILY CHECK	2-A-V	16E	4410521037
RD11 CWAR, TRANSMITTER-RECEIVER, DAILY CHECK	1-A-K	16E	4410521037
RD08 HIPIR, AMPLIFIER ASSEMBLY, CHECK	3-A-Q	16E	4410521025
RD05 HIPIR, ENERGIZE TO STANDBY	1-A-G	16E	4410521020
RD07 HIPIR, FALSE RADIATE TO FULL RADIATE	3-A-N	16E	4410521020
RD10 HIPIR, NO AND PA FILAMENT, DAILY CHECK	2-A-S	16E	4410521035
RD06 HIPIR, STANDBY TO FALSE RADIATE	2-A-K	16E	4410521020
RD15 IFF, ALINE TO BASE, PREPARE	1-A-I	16E	4410521052
RD16 IFF, ALINE WITH BASE PIECE	2-A-D	16E	4410521052
RD17 IFF, ALIGNMENT WITH BASE, VERIFY	3-A-G	16E	4410521052
RD01 PAR, ANTENNAS, DISASSEMBLE AND STOW	3-A-F	16E	4410521001
RD03 PAR, ANTENNAS, UNPACK AND ASSEMBLE	5-A-E	16E	4410521009
RD013 PAR, EQUIPMENT CABINETS, CLEAN AND DRY	1-A-G	16E	4410521042
RD02 PAR, M390 TRAILER, PREPARE FOR TRAVEL	4-A-K	16E	4410521001
RD07 PAR, RECEIVER MODES, DAILY CHECK	2-A-K	16E	4410521027
RD14 ROR, NULLING PROCEDURES, PERFORM	3-A-I	16E	4410521049
RD			
RD			
RD04-RANGEFINDER, LASER, CHECK BATTERY	1-F	13F	0612731950
RD02-RANGEFINDER, LASER, CHECK FOCUS ADJUST.	1-B	13F	0612731950

RN01* RANGEFINDER, LASER, CHECK LENSES	1-A	13F 0612731950
RN03* RANGEFINDER, LASER, CHECK MINIMUM RANGE	1-E	13F 0612731950
RN05* RANGEFINDER, LASER, CHECK RETICLE ILLUM.	1-G	13F 0612731950
RN06* RANGEFINDER, LASER, OPERATE AT DAWN	1-A-G	13F 0612731953
RN03* RANGEFINDER, LASER, OPERATE IN DUST, SAND	4-A-D	13F 0612731953
RN07* RANGEFINDER, LASER, OPERATE IN RAIN	3-A-D	13F 0612731953
R5		
R504 DESTROY EQUIPMENT, PREVENT ENEMY USE	TASK	17K 3013411303
R501* ENCODE MESSAGE, USING KAL 61	2-A-C	17K 3013411301
R503 ORGANIC RADIO EQUIPMENT, CONSTRUCT DIRECTIONAL ANT	3-B-F	17K 3013411302
R502 ORGANIC RADIO EQUIPMENT, DEF. TYPE OF INTERFERENCE	1-A-B	17K 3013411302
R505 RADAR, CAMOUFLAGE, POSITION IMPROVEMENT	2-A-C	17K 3013411304
R508 RADAR, CONFIRM NOISE AS ELECTROMAGNETIC INTERFER.	1-A-C	17K 3013411310
R509 RADAR, LOCATE SOURCE OF ELECTROMAGNETIC INTERFER.	2-A-C	17K 3013411310
R506 RADAR, SET-UP SURVEILLANCE CARD AND PLOTTER	1-A-B	17K 3013451305
R507 RADAR, USE SURVEILLANCE CARD AND PLOTTER	2-A-B	17K 3013451305
SM		
SM		
SM06 MOBILE CLOTHING REPAIR SHOP EQUIP, SET UP	7-A-F	43M 1015131101
SM05 TROUSER LEGS, HEM	2-A-B	43M 1015131151
SM04 TROUSER LEGS, PREPARE FOR SEWING	1-A-C	43M 1015131151
SM02 331K1 LIGHT DUTY, PREPARE FOR OPERATION	3-A-F	43M 1015131107
SM03 331K1 LIGHT-DUTY, AFTER-OPERATION MAINT.	5-A-D	43M 1015131107
SM01 331K1 LIGHT-DUTY, DAILY PM CHECKS	1-A-Q	43M 1015131107
TE		
TE		
TE03 TEL SWITCHBOARD SB-86/P, OPERATOR'S INSPECTION	1.	36C 1135947003
TE04 TEL, OPERATE CONSOLE 1A11 AN/TTC-25(V)	1-2	36C 1135952002
TE13 TEL, SIGNAL CONVERTER, CV1919A1G, SB86/P, INSTALL	1-4	36C 1136051001
TE12 TEL, SIGNAL CONVERTER, CV-1919A1G, SB86/P, OPERATE	1-4	36C 1136052001
TE05* TEL, SWITCHBOARD SB-86/P, GROUNDING	2-A-D	36C 1135941001
TE07* TEL, SWITCHBOARD SB-86/P, INSTALL BATTERIES	3-4	36C 1135941001
TE05* TEL, SWITCHBOARD SB-86/P, INSTALL, PREPARE	1-A-C	36C 1135941001
TE11* TEL, SWITCHBOARD SB-86/P, OPERATE	1-3	36C 1135942001
TE08* TEL, SWITCHBOARD SB-86/P, POWER CONNECTIONS	5-A-T	36C 1135941001
TE09* TEL, SWITCHBOARD SB-86/P, TEL, TRUNK, CONECS	6-A-C	36C 1135941001
TE10* TEL, SWITCHBOARD SB-86/P, PMCS	1-3	36C 1135943001
TE14* TEL, SWITCHBOARD, SB-86/P, INSPECT INSTALLATION	1-A-E	36C 1135947001
TE02 TELEPHONE SET TA-312/PT, PM CHECK	1-A-D	36C 1135887037
TE01 TELEPHONE SET TA-341/TT, INSTALL	1-A-B	36C 1136001003
TR		
TR		
TR03* BINOCULARS METHOD		
TR18* BORESIGHT, AUTO COLLIMATE CANT AXIS MIRROR	1-C	13F 0612831001
TR19 BORESIGHT, AUTO COLLIMATE FORWARD MIRROR	2-A-E	15D 0612852020
TR25 BORESIGHT, CANT MIRROR ALIGNMENT	3-A-C	15D 0612852020
TR23 BORESIGHT, HORIZONTAL COLLIMATION ADJUSTMENT	5-A-D	15D 0612852050
TR21 BORESIGHT, LAY MISSILE FOR AZIMUTH	3-A-D	15D 0612852050
TR20 BORESIGHT, LAY MISSILE FOR ELEVATION	3-A-H	15D 0612852030
TR17* BORESIGHT, PREPARE GUN SIGHT UNIT	1-A-E	15D 0612852030
TR22 BORESIGHT, STORE SIGHT-UNIT	1-A-C	15D 0612852020
TR24 BORESIGHT, VERTICAL COLLIMATION ADJUSTMENT	4-A-G	15D 0612852030
TR06* CALL-FOR-FIRE, CORRECT	4-A-I	15D 0612852050
TR28 CRATER/SHELL FRAGMENTS, ANALYZE	2-A-D	13F 0612831021
TR10* FINAL PROTECTIVE FIRE, ADJUST	2-A-D	13F 0613066004
		13F 0612832002

TR09*FINAL PROTECTIVE FIRE, TRANSMIT CALL	1.A-D	13F	0612832002
TR09*FIRE-FOR-EFFECT,ADJUST	2.A-B	13F	0612832001
TR09*GRID SQUARE COORDINATES,LOCATE	3.B	13F	0612831002
TR14*HIGH-EXPLOSIVE ROUNDS, ADJUST	3.A-D	13F	0612831022
TR07*ILLUMINATION/HE ROUNDS, COORDINATE	2.A-B	13F	0612831022
TR07*MAP AND M2 COMPASS METHOD	1.B	13F	0612831001
TR01*MAP AND OBSERVED FIRE FAN METHOD	1.A	13F	0612831001
TR05*OBSERVE-TARGET DIRECTION	1.A-C	13F	0612831004
TR13*RANGE,DEVIATION DATA (MORTARS), TRANSMIT	2.A-B	13F	0612832104
TR12*REFINEMENT DATA, TRANSMIT	2.A-D	13F	0612832103
TR26*SMOKE MISSION, CALL FOR FIRE	2.A-D	13F	0612832021
TR27*SUCCESSIVE BRACKETING, REFIN	3.A-E	13F	0612832102
TR15*TARGET SET TRIPOD, EMPLACE	1.A-B	15D	0612851290
TR16*TARGET SET, LEVEL	3.A-B	15D	0612851290
TR11*TARGETS, IRREGULARLY-SHAPED, LOCATE	1.A-D	13F	0612832003
TS			
TS			
TS05 TROUBLESHOOTING, DSPO OF COMPONENTS, BR & FLOW	5.	24C	4410531062R
TS07 TROUBLESHOOTING, ISOLAT FAULT, FAULT ISOLAT PROC	2.	24C	4410531062A
TS02 TROUBLESHOOTING, ISOLATE FAULT, BRANCH AND FLOW	2.	24C	4410531062B
TS03 TROUBLESHOOTING, LEVEL OF MAINT, AUTH, BR & FLOW	4.	24C	4410531062D
TS04 TROUBLESHOOTING, OPEATIONAL CHECK, BR & FLOW	4.	24C	4410531062D
TS01 TROUBLESHOOTING, VERIFY FAULT, BRANCH AND FLOW	1.	24C	4410531062B
TS06 TROUBLESHOOTING, VERIFY FAULT, FAULT ISOLAT PROC	1.	24C	4410531062B
WV			
WV			
WV21 ALTERNATOR, REMOVE (M911)	4.A2	63W	0914801259
WV04-BRAKE ASSEMBLY,CHECK AND REMOVE PARTS (915)	3.A-E	63W	0914801094
WV02-BRAKES, REPLACE PARTS (915)	4.A-F	63W	0914801004
WV02-BRAKES, ADJUST DRAG (915)	4.A-G	63W	0914801053
WV17-BRAKES, BLEED (5-TON)	4.I	63W	0914801243
WV10 CENTER DRAG LINK,REMOVE (4 X 2)	3.A-C	63W	0914801175
WV56 CONTROL VALVE BANK (M319 TRS),CLEAN	2.A-B	63W	0914802046
WV12-CYLINDER HEAD,CHECK FOR WARPAGE (M151)	2.A-B	63W	0914801203
WV14-CYLINDER HEAD,REMOVE PARTS (M151)	3.A-E	63W	0914801003
WV65 DRIVE MET M911 UNDER DIFF, ROAD CONDITIONS	4.A-E	63W	0914801003
WV27 ENGINE REMOVAL (5 TON TRUCK) DISCONNECT ATTACH.	3.A-M	63W	0914801235
WV20 ENGINE REMOVAL,LIFTING OUT (911)	3.A	63W	0914801259
WV19 ENGINE REMOVAL,M911,DISCONNECT ALL ATTACH.(M511)	2.A-V	63W	0914801259
WV12 ENGINE REMOVAL,M911,PRELIMINARY PROCEDURES (M911)	1.A-F	63W	0914801359
WV44-ENGINE, START, 5-TON SERIES, ABOVE 32 DEGREE F	6.A1	63W	0914802092
WV43-ENGINE, START, 5-TON SERIES, BELOW 32 DEGREE F	6.A2	63W	0914802082
WV26 ENGINE INSTALL (M911)	6.A-H	63W	0914801259
WV16 FLYWHEEL,INSPECTS	1.A-C	63W	0914801045
WV66 FORDING WATER WITH VEHICLE (M911)	4.C-H	63W	0914801259
WV55 FORKLIFT, EXTENSION SYS., PRESSURE TEST	2.B	63W	0914802179
WV49 FORKLIFT, FLOW TEST ON FRONT STEERING CYLINDER	1.A	63W	0914802172
WV54 FORKLIFT, HYDRAULIC SYS, CYLINDER FLOW TEST	1.A	63W	0914802172
WV23 FORKLIFT, PRESSURE TEST ON FRONT STEERING CYL.	1.B	63W	0914802172
WV23 FUEL FILTER HOUSING REMOVE (M911)	4.A6	63W	0914801259
WV41 FUEL INJECTOR RACK,CLEAN, ADJUST CLEARANCE	3.A-A	63W	0914802431
WV40 FUEL INJECTOR RACK,CLEAN, ADJUST	2.A-I	63W	0914802431
WV42 FUEL INJECTORS, (M815), ADJUST	4.7.2-5	63W	0914802431
WV42 FUEL INJECTORS, (M815), ADJUST	1.A-A	63W	0914802432
WV33 FUEL BEARING REPAIR	3.A	63W	0914802432

NV63 PRE-STARTING CHECKS (HET M911), PERFORM	2. A	63W 0914991912
NV28*PRESSURE PLATE (5 TON TRUCK), INSPECT	2. A	63W 0914801239
NV51 RIGGING CABLES (M911), CONNECT TO DISABLED VEH.	3. A-J	63W 0914991917
NV60 ROCKER LEVER HOUSING (M313), REPLACE	4. B	63W 0914802265
NV01 SLACK ADJUSTER, REMOVE (915)	4. A-G	63W 0914801053
NV22*STARTER, REMOVE (M911)	4. A-5	63W 0914801259
NV64 STARTING CHECKS, (HET M911), PERFORM	2. B	63W 0914991912
NV06 STEERING GEAR ASSEMBLY (M125), REPLACE	1. A-I	63W 0914801083
NV07 STEERING GEAR BOX, REPLACE (M125)	4. A-H	63W 0914801083
NV43 STEERING GEAR COLUMN, REMOVE (5-TON)	1. A-E	63W 0914802282
NV46 STEERING, CHECK FOR PROPER OPERATION (5 TON)	6. C	63W 0914802282
NV17 TIRE & HUB ASSEMBLY, REMOVE (915 SERIES)	2. A-M	63W 0914801051
NV93 TIRE & HUB ASSEMBLY, REMOVE FROM 915 SERIES	2. A-M	63W 0914801054
NV11 TIRE PRESSURE, CHECK & FILL (4 X 2)	5. A-B	63W 0914801175
NV18 TOE-IN ADJUSTMENT (5-TON VEHICLE)	4. L	63W 0914801243
NV12 TOE-IN ALIGNMENT, PERFORM (4 X 2)	6. A-D	63W 0914801175
NV24 TRANSFER CASE (2-1/2 TON TRUCK), POST-MAINT. CHECK	6. A-D	63W 0914801226
NV25 TRANSFER CASE (2-1/2 TON TRUCK), REMOVE	2. A-M	63W 0914801226
NV29 TRANSMISSION (5 TON TRK), REMOVAL, PRELIM. PROCED.	1. A-L	63W 0914801241
NV08 TRANSMISSION & ENGINE ASSEMBLY (M380), REMOVE	2. A-D	63W 0914801169
NV09 TRANSMISSION & ENGINE ASSEMBLY (M380), SEPARATE	3. A-H	63W 0914801169
NV31 TRANSMISSION (M911) REMOVAL PROCEDURES	1. A-F	63W 0914801256
NV30 TRANSMISSION (5-TON TRK) REMOVAL, FOLLOW-UP MAINT.	4. A-K	63W 0914801241
NV57 VALVE LASH (M 35), CHECK	1. C1	63W 0914802019
NV62 VALVES (M813), ADJUST	4. I. 6-B	63W 0914802265
NV53 VALVES, LEAKING (M 35), CHECK	1. C2	63W 0914802019
NV15*VALVES, ADJUST (M151)	4. D	63W 0914801003
NV59 WATER MANIFOLD (M813), REMOVE	1. F	63W 0914802265
NV34 WRECKER, CHECK EQUIP., BEFORE LEAVING SHOP	1. A	63W 0914991906
NV36*WRECKER, DETERMINE TOWING METHOD	3. A-I	63W 0914991906
NV35 WRECKER, INSPECT DISABLED VEHICLE	2. B-D	63W 0914991906
NV53 WRECKER, PREPARE FOR TRAVEL	7. A	63W 0914991902
NV52 WRECKER, RIG LOAD BY DETERM. MECH. ADVANTAGE	4. A-I	63W 0914991902
NV38 WRECKER, TOW BY LIFTING FRONT END	5. A-G	63W 0914991906
NV39 WRECKER, TOW BY LIFTING REAR END	6. A	63W 0914991906
NV37*WRECKER, TOW W/STRAIGHT PULL, NO LIFT	4. A-D	63W 0914991906
NV32*WRECKER, DETERM. WT. & LENGTH BEFORE LIFTING VEH.	1. A-B	63W 0914991905

ATTACHMENT M

Complete List of Subtasks Developed and Used

RCA / BSEP

FINAL SUBTASK INDEX

***** ARMORED VEHICLE *****		
AV		
AV11	GRILLE DOORS, CLOSE EXHAUST M60 TANK	6.I 63N 0914841003
AV04	GRILLE DOORS, OPEN EXHAUST, M60 TANK	1.F 63N 0914841002
AV05	GRILLE DOORS, OPEN TOP DECK, M60 TANK	2.A 63N 0914841002
AV09	GRILLE DOORS, CLOSE TOP DECK M60 TANK	6.F 63N 0914841003
AV17	IDENTIFY ELECTRICAL MALFUNCTIONS USING SCHEMATIC DIAGRAM	45K
AV16	REPAIR ELECTRICAL COMPONENTS	45K
AV93	REPAIR ELECTRICAL COMPONENTS (KNOX ARMORED VEHICLE)	45K
AV10	SHROUD, INSTALL TRANSMISSION M60 TANK	6.G-H 63N 0914841003
AV07	SHROUD, REMOVE TRANSMISSION M60 TANK	1.G 63N 0914841002
AV15	TURRET, RETURN TO TRAVEL MODE M60 TANK	7. 63N 0914841003
CT		
***** SOLDIER COMMON TASKS *****		
CT01	HAND SIGNALS, GUIDE HOIST/VEHICLE OPERATOR	5.C 63N 0914841002
DR		
***** DRILLING (WOOD & METAL) *****		
DR10	DRILL HOLE, CHECK COMPLETED WORK	9.A-F 44E 0914691056
DR01	ELECTRIC DRILL (1/2"). PROPER DRILLING METHOD	3.A-H 44E 0914691055
DR03	HAND TAP, PERFORM TAPPING OPERATION	4.A-D 44E 0914691056
EU		
***** EQUIPMENT USE *****		
EU18	CHECK/TEST SWITCH/RELAY CNTC FOR CONT W MULTIMETER	45K
EU07	DEPTH GAGE, INSPECT FOR GOUGES/SCRATCHES	7.B 67U 5517561064
EU23	DESOLDER LEADS	45K
EU24	INSTALLS REPLACEMENT ELECTRICAL COMPONENTS	45K
EU09	MICROMETER, OUTSIDE, USAGE	3.E.2 63W 0914802028
EU08	MULTIMETER, CHK FOR CALIBRATION DATE, DAMAGE	2.B1-2 63N 0914841048
EU11	MULTIMETER, CONTINUITY TEST	1.E 63W 0914802023
EU10	MULTIMETER, DC VOLTAGE TEST	1.C 63W 0914802023
EU13	MULTIMETER, MAINTAIN TS 352 B/V	TASK 17K 3013411308
EU12	MULTIMETER, ZERO	2.B 63N 0914841048
EU17	SET UP MULTIMETER TO CHECK RESISTANCE/CONTINUITY	45K
EU25	SOLDERS LEADS	45K
EU03	TORQUE WRENCH, USE OF	5.D.1-12 63W 0914801238
EU16	USING VERNIER CALIPER AND WEAR LIMITS TABLE	45K
EX		
***** EXPLOSIVES *****		
EX02	BLASTING CAP, CONNECT TO FUSE	2.A-B 15D 0612856002
EX01	BLASTING FUSE, DETERMINE LENGTH, TIME	1.A-D 15D 0612856002
FO		
***** FORMS *****		
FO21	COMPLETE DA FORM 2407, MAINTENANCE REQUEST	TASK 26Q 1136233003
FO02	DA FORM 2402, USED FOR DIRECT EXCHANGE AND ID	5.C 24C 4410538261
FO19	DA FORM 2765 - AVIATION REQUEST FORM	2.A-B 67U 5517551024
FO03	DD FORM 314 (SCHEDULED & PERFORMED MAINTENANCE)	1.A-K 26Q 1136233004
FO05	FORM COMPLETION DA FORM 1150	2.A-D 19D 1711231003
FO04	FORM COMPLETION DA FORM 2062	1.A-E 19D 1711231003
FO06	FORM COMPLETION DA FORM 2404	1.-2. 17K 3013411309
FO07	FORM COMPLETION DA FORM 2408-1	2.A-F 19D 1711231023

FO12 FORM COMPLETION DA FORM 2408-12	2.A-H	67U 5517651010
FO13 FORM COMPLETION DA FORM 2408-13	2.A-P	67U 5517651011
FO08 FORM COMPLETION DA FORM 2496	4-9	71L 1210041201
FO18 FORM COMPLETION, DA FORM 2402	2.A-H	67U 5517651007
FO27 FORM INSPECTION COMPLETED DA FORM 2404	2.	36C 1135947003
FO01 NATIONAL STOCK NUMBER, ALL INFORMATION IN USE	3.A-B	24C 441053G261
GN		
* * * * * GENERATORS * * * * *		
GN05 POSITIONING AND SET-UP, DIRECT	1.A-M	26Q 1136017033
GN12 10KW, MEP-018A, MEP-023A, INSTALL	1-3	26Q 1136011002
GN13 10KW, MEP-018A, MEP-023A, OPERATE	1-7	26Q 1136012003
GN04 15KW, PV-405/G, PERFORM DAILY PM	1.A-C	26Q 1136013007
GN03 15KW, PV-405/G, START AND APPLY LOAD	2.A-EE	26Q 1136012012
GN02 3KW, MEP-016A, -021A, START	2.A-G	43M 1015131106
GN11 5KW, MEP-017A, MEP-022A, INSTALL	1-3	26Q 1136011001
GN09 5KW, MEP-017A, MEP-022A, OPERATE	1-6	26Q 1136012001
MI		
* * * * * MILITARY INTELLIGENCE * * * * *		
MI04 DETERMINE ELEVATION OF A POINT ON A MAP	1.	96B 0713291004
MI34 DETERMINE MILITARY ASPECTS OF WEATHER	2.	96B 3013361404
MI05 DETM. AZIMUTHS, USING COORDINATE SCALE/PROTRACTOR	1.	96B 0713291010
MI25 ENTER INFORMATION ON SIT MAP	1.A	96B 3013361303
MI03 LOCATE A POINT OF THE MAP USING COORDINATE SCALE	1.	96B 0713291004
MI21 USE MARGINAL INFORMATION ON MAP	TASK	96B 3013361004
MR		
* * * * * METAL REPAIR * * * * *		
MR34 BIT, DRILL, PORTABLE, SELECT, INSTALL AND ADJUST	3-4	44B 0914681213
TR		
* * * * * TARGETING * * * * *		
TR06 CALL-FOR-FIRE, CORRECT	2.A-D	13F 0612831021
WV		
* * * * * WHEELED VEHICLE REPAIR * * * * *		
WV44 ENGINE, START, 5-TON SERIES, ABOVE 32 DEGREE F	6.A1	63W 0914802282

ATTACHMENT N

MOS Summaries

MOS Summary - 05B RADIO OPERATOR

Analysis Approach - Interviewing was done in the morning, 3-4 days per week, with Friday mornings reserved for verification. Meetings with SMEs were held in the RCA office with visits to the course, whenever it could be arranged, if certain concepts required detailing. Tasks to be analyzed were given to RTMD each week and they were responsible for contacting the course to locate knowledgeable SMEs.

Problems - There was a problem in communication between "departments" with the SME receiving the "short end". The course would be notified by RTMD and then they (the course) were to notify the SME. Often the SME was not notified and when RCA called to tell the course no one had showed up for the interview, the SME would be pulled from the classroom without notice or might not be available because of special duty, etc. This caused loss of time, attitudinal problems and created problems for the students.

One section of the course caused a little stir when a section chief told the SMEs from his area of the course not to give the analyst any information. Perhaps he had not been informed as the purpose of the project.

Discrepancies - The only discrepancies noted concerned equipment that was outdated. The task would state how to perform using the outdated equipment, and the SME would know how to perform the task using other types of equipment more readily found. There were a few pieces of equipment that were so specialized that RTMD could not locate people familiar with them. Ex. FRC-93.

There were some procedural and equipment differences brought about by the SME's experience in different units. For example, an 05B in an infantry unit may not have performed the task quite the same or used the same equipment to perform the task as an SME in a signal unit.

Soldier's Manual - The Soldier's Manual was helpful on some of the tasks, but sometimes the setting in which the task was performed seemed artificial and could not readily be identified with. After setting a scenario, analysis could proceed, but this did cause some time loss.

Equipment - Some equipment was not available due to security reasons. Some newer equipment was not available, causing analysis to be sketchy and idealistic. Much of the equipment was multipurpose. The same RT (receiver-transmitter) could be used with different components for different purposes. It seemed that the "12 Series" radios were the bread and butter of the MOS and could be used in a variety of ways with the addition or substitution of components.

05B - 2

Personnel - SMEs were knowledgeable concerning almost all of the equipment and knew the capabilities of each piece, if they were older - especially the E-7's with 15+ years of experience. Younger SMEs were more limited due to lack of real field experience. Changes occurred in personnel because of duties, moves, experience, but not burn-out.

Types of Knowledges - Safety and identification seemed to be the most important knowledges. Lack of understanding on how the equipment operates causes damage to equipment and down time.

Radio Procedures, which comprise short term memory, some memorization, sequencing, familiarity with technical vocabulary and use of charts were important.

Troubleshooting of equipment requires knowledge of "what causes what" and demands basic electronic skills that only the older operators seemed to possess.

Reading skills required seemed to be confined to use of CEOI, report writing, and form filling.

Instructional Review - Review was done by a person in DTD who was familiar with the course and the lesson plans. 05B is totally self-paced, with some variety of instruction at Willard and Mobile Training areas. At times when we were asking SMEs what was taught, they were only able to respond to things in their own lesson: they were not sure what was taught anywhere else. Some things were taught rather off-hand but not as a major objective.

ETAP Manual - Procedures used in the ETAP Manual were very helpful.

MOS Summary - OSC RADIO TELETYPE OPERATOR

Analysis Approach - Interviewing was done in the morning, 3-4 days per week, with Friday mornings reserved for verification. Meetings with SMEs were held in the RCA office with visits to the course, whenever it could be arranged, if certain concepts required detailing. Tasks to be analyzed were given to RTMD each week and they were responsible for contacting the course to locate knowledgeable SMEs.

Problems - The only problem encountered was finding somebody qualified to operate the UGC-74 teletype.

Discrepancies - The only discrepancies noted concerned equipment that was outdated. The task would describe how to use this outdated equipment, but the SME knew how to perform the task using other types of updated equipment. There were a few pieces of equipment that were so specialized that RTMD could not locate people familiar with them, Ex. FRC-93.

There were some procedural and equipment differences brought about by the SME's experience in different units. For example, an OSB in an infantry unit may not have performed the task quite the same or used the same equipment to perform the task as an SME in a signal unit.

Soldier's Manual - The Soldier's Manual was helpful on some of the tasks, but sometimes the setting in which the task was performed seemed artificial and could not readily be identified with. After setting a scenario, analysis could proceed, but this did cause some time loss.

Almost all tasks were covered in the OSB analysis using OSC personnel; there weren't very many OSB's. Only a few additional tasks were required to perform as an OSC, especially those involving the use of the teletype.

Equipment - Some equipment was not available due to security reasons. Some newer equipment was not available, causing analysis to be sketchy and idealistic. Much of the equipment was multipurpose. The same RT (Receiver-Transmitter) could be used with different components for different purposes. It seemed that the "12 Series" radios were the "bread and butter" of the MOS and could be used in a variety of ways with the addition or substitution of components.

Personnel - SMEs were knowledgeable concerning almost all of the equipment and knew the capabilities of each piece, especially the E-7's with 15+ years of experience. Younger SMEs were more limited due to lack of real field experience. Changes occurred in personnel.

05C - 2

because of duties, moves, experience, but not burn-out.

Types of Knowledges - Safety and identification seemed to be the most important knowledges. Lack of understanding on how the equipment operates causes damage to equipment and down time.

Radio Procedures, which comprise short term memory, some memorization, sequencing, familiarization with technical vocabulary and use of charts were important.

Troubleshooting of equipment requires knowledge of "what causes what" and demands basic electronics skills that only the older operators seemed to possess.

Reading skills required seemed to be confined to use of CEOI, report writing, form filling.

Instructional Review - Review was done by a person in DTD who was familiar with the course and the lesson plans. 05B is totally self-paced, with some variety of instructions at Willard and Mobile Training areas. At times when we were asking SMEs what was taught, they were only able to respond on things in their own lesson and they were not sure what all was taught anywhere else. Some things were taught rather off-hand not as a major objective.

ETAP Manual - Procedures used in the ETAP Manual were very helpful.

MOS SUMMARY - 05G SIGNAL SECURITY SPECIALIST

Analysis Approach - Analyst was given an office adjacent to instructor's offices to facilitate the interviewing process. There, interviews were conducted for four to five hours per day, four days per week. It was observed that beyond 3.5 hours of interview time, SME and analyst became less effective in uncovering procedure detail. Several interviews were cancelled by SMEs with no prior notice, often leaving analyst waiting. Analyst observed that SME assignment was passed around with little deliberation or prior planning. The verification process, on the other hand, was approached with more seriousness. All work was verified by an experienced 05G who also served as school and TADD (Training Analysis Design Division) liaison. This increased analyst's confidence in work obtained from SMEs.

Problems - No significant problems.

Discrepancies - None.

Soldier's Manual - Analyst found Soldier's Manual accurate and comparatively up to date. The manual was concise and outlined tasks with clarity. Some areas were identified by SMEs where "05G's" are increasingly being required to be knowledgeable, specifically, radar and computer surveillance. These areas were felt to be inadequately represented in Soldier's Manual and Task List.

Equipment - None.

Personnel - None.

Type of Knowledge - 05G MOS was analytical in nature. The 05G must be able to take fragments of information over a period of time, switch to enemy point of view, and then coalesce the information into possible security leaks. While math skills are necessary, their use is limited; the important skills are reading and synthesizing ideas.

MOS SUMMARY - 11B INFANTRYMAN

Analysis Approach - Over 50 SMEs were required to complete the MOS 11B due to the different particular areas. In many cases, the SMEs were very specialized in one area and they could not be interviewed for any tasks outside their area of expertise. A different SME or group of SMEs were required to be used for each specialized area. Committee groups of instructors were utilized for added verification and input. The added review was valuable in identifying discrepancies and producing a better final product.

Problems - A shortage of qualified experts in technical areas created pressure on the SMEs when coupled with the demands of the analysis, caused a reluctance on the part of the SMEs to participate in full support of the project. This caused varying degrees of difficulty in the information to be extracted. It was often difficult to obtain the information in a timely manner because of the demands in their scheduling. This problem caused the work to be on temporary hold until the SME was available again to the project to complete the tasks.

Discrepancies - The major discrepancies found involved the M16A1 rifle and the M203 grenade launcher. When analyzing the starlight scope in the M203 grenade launcher, the instructions that were being used and taught were incorrect for the M16A1 rifle. The discrepancy was found and the tasks were corrected. The instructors of the starlight scope had been using the old instructions and corrected the errors in the use of the equipment. This discrepancy was found during implementation and usage of the starlight scope which, in turn, caused the instructions to be taught improperly.

Soldier's Manual - The soldier's manual varied greatly in its content and was outdated. The tasks were written well and were up to date. These were the areas of the manual that dealt with assembly and disassembly of various pieces of equipment. Most tasks written in the soldier's manual were explained in general terms and lacked the comprehensive procedural detail needed for their accomplishment. Many of the newer tasks were nonexistent in the soldier's manual causing the manual to be of limited value in only certain areas.

Equipment - Equipment for the 11B (Infantryman) soldier is varied and complex. Some equipment such as the platoon early warning system and night vision equipment is in very limited supply because of time demands in training experience. Due to the limited time of training, familiarization is kept to a minimum. Much of the responsibility seems to be delegated to the unit the individual will be going to and its specific unit requirements.

15-4-2

Problem - The availability of the SMEs was unreliable. Some SMEs would say they were going to attend for a task interview and then not show up for the meeting. The analyst notified the POC and on these occasions who was able to rectify the situation each time. The support given by the POC and Infantry School was extremely beneficial in completing the project.

Types of knowledge - Estimating measures of varying lengths are used throughout the TDS in performing many of the tasks involving the alignment of weapons on targets. Map reading, involving recognition of characteristic symbols, and math are skills used extensively. Ruler, lines and scales are used for various weapon sights. Verbal and visual communication is needed in leading patrols and adjusting firing positions. Safety must be practiced continually in working with ammunition, from technical equipment to the reconnaissance of pertinent information.

MOS Summary - 11C INDIRECT FIRE INFANTRYMAN

Analysis Approach - Pre-analysis planning determined that the 11C MOS consisted of two distinct schools: the mortar crewmen and the computer. Subject Matter Experts advised that the analysis would be easier beginning with the mortar crewmen tasks. The more difficult computer tasks were those which followed the completion of the mortar crewmen tasks.

The tasks were analyzed by equipment. For example, all 81-MM mortar tasks were analyzed first followed by 4.2-inch mortar tasks, then 60-MM mortar tasks, M19 plotting board tasks, M16 plotting board tasks, and firing chart tasks. Although interviews were conducted in an office away from the sites, there was access to the necessary TMs for picture references and the necessary computer equipment. Following the completion of a number of tasks, the SME would take the write-ups to the mortar committee for verification. The tasks were returned within a week with suggestions for improvement. This feedback was conveyed to the analyst by the SME.

Problems - No problems were encountered. Full cooperation by all military and civilian personnel involved with the project was the norm at the 11C course.

Discrepancies - The only semblance of a discrepancy was that the tasks were written with the emphasis on the gunner's role in the 3- or 4-man crew (i.e., those tasks in the FM). The analysis, however, was written describing each man's role as a member of the crew in terms of functions and when such functions would be performed.

Soldier's Manual - The 18 September 1981 soldier's manuals were used as references. Both the Skill Level 1 and 2 manuals were better than most in outlining each task.

Equipment - Equipment used by 11C personnel include:

- A. 4.2-Inch mortar
- B. 81-MM mortar
- C. 60-MM mortar
- D. Equipment associated with the mortars includes various types of ammunition, a bore-sight, and a sight
- E. M2 compass
- F. Aiming circle
- G. Mortar firing tables
- H. M16 Plotting board
- I. M19 Plotting board
- J. Firing chart and its associated equipment
- K. Communications equipment including the AN/VRC-64 radio, AN/GRC-160 radio, SB-22 switchboard, and the TA-312/PT and TA-1/PT telephone sets

Personnel - Except for the first week or two of analysis, one SME was used for the entire MOS. The SME and other 11C personnel were dedicated to the project, which resulted in complete cooperation. The one SME used for the original analysis was extremely bright and articulate in making information-gathering quite easy. The SME had all of the tasks verified through the mortar committee which saved considerable amounts of time for the analyst.

Types of Knowledges - Types of knowledges included:

- A. Graphing in coordinate planes
- B. Recognizing task-related vocabulary
- C. Geometry to include lines and planes
- D. Gauge measurement
- E. Degree measures (azimuth)
- F. Numbering and counting
- G. Linear measures
- H. Identifying parts or details according to a key or legend
- I. Determining grid coordinates
- J. Adding and subtracting of whole numbers and fractions
- K. Manipulating objects to align, match, mate, make parallel, be perpendicular, or be at an angle
- L. Completing forms
- M. Determining information from charts and tables
- N. Providing the appropriate amount of information via verbal communication
- O. Note taking
- P. Recognizing the types of firing missions and how each is fired and plotted
- Q. Motor skills to include controlled precision and finger dexterity in operating equipment in coordination with crew members and plotting points and determining firing data
- R. Selecting appropriate action in emergency situations

MOS SUMMARY - 11H HEAVY ANTIARMOR WEAPONS CREWMAN

General Commentary:

Major Problems - No major problems occurred during analysis.

Manual (Skill Level 1 and Skill Level 2) - Subject Matter Experts (SMEs) point out that tasks included in Soldier's Manual FM7-11H1 and Soldier's Manual FM7-11H2 are written to reflect skill qualification test (SQT) standards and do not reflect the combat standards according to which these tasks are taught in advanced individual training (AIT). TOW/ITV instruction is crew-drill oriented, according to SMEs, whereas the soldier's manuals focus on performance measures geared to the individual soldier. The SMEs say that the tasks presented in the soldier's manuals are out of synchronization with the school's program of instruction (POI), but not so much with reference to what is taught as with reference to how it is taught.

According to the analyst, the soldier's manuals seem to him confronted by a problem of semantics: 'conditions', as interpreted for each task, apparently means equipment and not a stipulation or provision -- a circumstance essential to the appearance or occurrence of something else; a prerequisite: 'standards', as interpreted for each task, apparently means a prerequisite and not that which is set up and established by authority as a rule for the measure of quality, or excellence: 'performance measures', as interpreted for each task, apparently means background information -- i.e., something about something, and not a detailed proceduralization.

Equipment - All equipment specified in FM7-11H1 and in FM7-11H2 for tasks listed was made available for original analysis.

Discrepancies - SMEs concur in opinion with reference to the amount of time allotted for TOW/ITV instruction, saying that it is insufficient. Approximately 75% of the information contained in the soldier's manuals is covered during AIT (TOW, 40 hours; ITV, 80 hours). SMEs say that instruction at Lee Field provides the entry-level soldier with an orientation to the TOW Weapons System; this instruction differs, according to unit SOP, after the soldier graduates and goes to a unit; so they say, the instruction that is provided by the unit has no homogeneity Army-wide.

Personnel - The majority of 11H instructors interviewed demonstrated an appreciable understanding of their task-specific objectives, according to the analyst, and the majority of them seemed motivated both as individuals and as a group. All of the SMEs expressed their enthusiasm about the mechanization of the infantry, and they take pride in the uniformity of their instructional techniques. The analyst said that this pride and this enthusiasm pervades the ranks of the trainees, too, as they show plenty of incentive to become top gunner among their peers, a distinction that the instructors extol. There is a marked absence of a polarization of personalities among

the personnel on Lee Field, the analyst said, and he cited the substantive support given to the analysis project. Of particular importance in expediting the analysis was the expertise of the SME responsible for the bulk of original analysis interviews; for, according to the analyst, it was this soldier's professionalism -- acknowledged by his fellow instructors as well as by his superiors -- that got the job accomplished with maximum effect in a minimum amount of time. He also is a soldier who thinks consistently in terms of the combined arms concept, the analyst said.

Depth and Type of Knowledges - Though the type of knowledge differs for each crewman's on-vehicle duty position (ITV) and for his duty position whenever utilizing the TOW weapons system in its ground-mounted mode (TOW), because the 11H soldier is cross-trained to function effectively at any of these duty positions it is assumed that the various knowledges apply to the entire crew, according to the analyst. He said that the 11M soldier must make many choices, draw inferences and determine various courses of action; his powers for verbal communication, for comprehending visual spatial relationships, for an awareness of and an attentiveness to safety and security are expected to be high. The 11H soldier also must possess quick reaction time, muscular control combined with agile multi-limb coordination, and motor skills that enable him to perform equally effectively either while on foot or while mounted on a vehicle; his capacity to recognize changes via his five senses must be acute. The analyst also said that the 11H soldier must comprehend time-telling measures, degree measures, and linear measures, read various types of gauges, count and differentiate among methods of numeration, and carry out the simple mathematics procedures of addition, subtraction, multiplication, and division.

Analysis Approach Commentary:

Extended Task Analysis Procedure (ETAP) Manual - A variation from the approach presented in the ETAP Manual was made by the analyst with reference to a hierarchical format and also with reference to the methodology for arriving at a knowledge analysis.

Because many of the 11H tasks included in FM7-11H1 and in FM7-11H2 are crew-drill oriented, the analyst chose to proceduralize these tasks according to each crewman's actions. He said that he chose this format because it assigns specific facts within a specific portion of the proceduralization to a specific crewman. In short, the proceduralization is given additional form in order to prevent the facts from eluding the crewman. Facts and ideas in chronological order alone cannot be conveyed always to another's mind without loss and are hardly likely to carry much meaning even for the possessor. Each crewman's mind demands regularity and symmetry, and is affected by the presence of a form that tailors the facts and ideas to him. In the act of impressing facts on the crewman's mind, form also expresses for the crewman the relationship of his actions to the actions of the various other crewman performing the task. This, according to the analyst, leaves less room for guessing at what the facts mean. Such organization distributes emphasis in the right places. The crewman's mind cannot give equal attention to every part.

it must be guided to those parts which it should attend to for a correct understanding. Repetition, likewise, is a form. Repetition is a signpost emphasizing that the crewman's mind look this way or that. For example, whenever a step within the proceduralization calls for the recording of information such as on DA Form 2404 then the very next step must read 'notify organizational of any deficiencies, by using DA Form 2404 columns "a" and "c"!'. The wrong emphasis, as exemplified by the placement of a single blurb with reference to recording a report of damages at the ending of a proceduralization, destroys form; and, according to the analyst, it robs the crewman of the regularity and symmetry his mind demands. Consequently, the facts elude him. Consequently, a report that must be recorded may well be relegated to a later time when, in fact, the idea of the urgency for such a report carries little meaning.

Skill and knowledge analyses more often than not has caused SMEs interviewed to become uncomfortable, the analyst said; therefore, in light of past results obtained with SMEs in other MOS, instead of following the ETAP Manual's guidelines without any degree of divergence, the analyst teased out from the SMEs interviewed in the 11H MOS generalizations with reference to skills and knowledges required by the entry-level soldier and did not inquire repeatedly for such information in relationship to each and every performance measure. By-and-large, the attitude expressed by SMEs with reference to analysis of skills and knowledges is of no value, i.e., to the soldier. The analyst said that whenever the interview went beyond a discussion of the motions a soldier goes through in performing a task the SMEs - even the best among them - reacted defensively to the analyst's questioning, almost as though each of them was then waiting to be asked to work a mathematics problem at a chalkboard at the head of a classroom, and suddenly experienced a rush of embarrassment. The analyst's approach to this reaction was to back off from further questioning, explaining to the SME that it would be helpful enough on the SME's part if he simply were to indicate the specific points throughout the interview where it was his opinion that a soldier may need to know arithmetic, or may need to become keenly observant of some phenomena, or may need to do various actions simultaneously. Whenever the SME's opinion had been offered, the analyst then made a marginal note of what was said and returned to that note either later during the interview or else during the analysis write-up in order to isolate skills and knowledges utilized. Also, during the verification procedure and the instructor review procedure, the problem was approached by asking the verifier or else the instructor where they in agreement with the knowledge analysis as presented by the SME who had contributed the facts during original analysis. Sometimes very favorable responses were elicited, the analyst said, because the verifier or the instructor seemed less likely to hold back from articulating his own insights in relationship to the things already said by someone else before him. In this manner, the analyst obtained additional input with reference to skills and knowledges.

MOS SUMMARY - 11M FIGHTING VEHICLE INFANTRYMAN

General Commentary:

Major Problems - No major problems occurred during analysis.

Manual - (Skill Level 1 and Skill Level 2): FM7-11M10 and FM7-11M20 are outlines of major steps involved in carrying out the performance measures of the tasks included in each of these soldier's manuals. A few of the tasks, as explained in these soldier's manuals do contain extended proceduralizations; but even these few tasks do not proceduralize the performance measures with a focus on crew-drill, which must be done and specifically with reference to those tasks dealing with the Bradley Fighting Vehicle M2/M3. Because these two soldier's manuals are draft publications, the proceduralizations developed by extended task analysis procedures (ETAP) for the crew-oriented tasks may become part of any future publications, as well as the various proceduralizations derived from ETAPs conducted by RCA in related MOS.

Equipment - A Bradley Fighting Vehicle M2 was made available for hands-on analysis throughout the course of the project.

Discrepancies (over-all MOS) - No apparent discrepancies are reported by the analyst, although he said that he did overhear talk among the SMEs with reference to problems in two areas: a lack of resident instructors, and inadequate planning in the construction of the training ranges (1 out of 3 can be utilized whenever other than stationary firing is conducted).

Personnel - All of the 11M instructors interviewed demonstrated an appreciable understanding of the task-specific objectives, according to the analyst, and all of them seemed motivated both as individuals and as a group. Each of these instructors displayed a capacity for conceptualization and each of them expressed well verbally. Every one of these instructors interviewed was able to use the Bradley Vehicle and its components in a hands-on fashion to explain further how the Soldier's Manual tasks are performed, the analyst said. The SME responsible for the majority of original analysis displayed a keen intelligence, compiled notes, and wrote suggestions to himself which he intends to employ in his role as instructor. The analyst said that this SME is a good instructor.

Depth and Type of Knowledges - The 11M soldier must make many choices, draw inferences and determine various courses of action... as must his first-cousin in the 11H MOS. He must communicate verbally with his fellow crewmen, and oftentimes must give directions or else issue commands, the analyst said. Comprehending spatial relationships, attending to safety and security, reacting quickly using multi-limb coordination and also muscular control are pre-requisites to the 11M soldier's success. The analyst said that this soldier's capacity to recognize

11M - 2

changes via his five senses must also be high; he must comprehend time-telling measures, degree measures, linear measures and be able to read various types of gauges, count and differentiate among methods of numeration and carry out simple mathematics procedures of addition, subtraction, multiplication and division.

Analysis Approach Commentary:

Extended Task Analysis (ETAP) Manual - Refer to and use commentary offered with reference to MOS 11H (Analysis Approach Commentary), pages 3-5.

The manual is helpful, according to the analyst, especially during pre-analysis planning; he used it during the planning stage of analysis as a guideline for his explanation to the SME of what results were to be achieved through the analysis. After the SME understood that a data bank of information is of importance to developing the analysis the SME then was able to give input to planning by structuring a route of travel through the maze of tasks, utilizing each task as a kind of building block to be referred to later (alone or else in combination with other tasks), as the over-all analysis of the MOS progressed.

Commenting with reference to the substantiation, the verification and the review procedures, the analyst said that he found such a cross-check on information beneficial to isolating gross errors as well as to polishing, to refining detail.

RCA Service Company's Computer Terminal system saved much valuable time whenever action was necessitated with reference to an exchange of information. Good communications via this electronic medium, as well as responsive, immediate personal communication between RCA's Cherry Hill staff and the analysis site, contributed to resolving most appropriately any difficulties encountered by the analyst.

MOS SUMMARY - 12B COMBAT ENGINEER

Pre-Analysis Approach - Pre-analysis of the MOS consisted of briefing sessions with 12B personnel to familiarize them with the project. Goals were discussed as well as procedures for implementing the analysis, plus the requirements necessary to complete the analysis.

A senior NCO was furnished to review the contract task list for possible changes and to generally go through pre-analysis checklist found in ETAP manual. As a result of this meeting, the analyst found that the SM was being completely revised and that instead of some 118 tasks, there would be 48 skill level 1 and 2 tasks, plus 3 common subject tasks for which the Engineer School has proponency. A letter for the Colonel's signature outlining proposed changes was prepared, signature obtained and forwarded to the Project Director, RCA, Cherry Hill, N.J.

Tasks were arranged in ascending order of difficulty. Two SMEs were to perform all tasks with help from 12C section on bridging.

Analysis - Interviews were held in Conference Room of 12B section which enabled easy access to section personnel and the reference materials. Interviews were held 5 days a week for 3 hours each morning, starting in April 1982.

The format used was that established by ETAP manual: The first SME provided a detailed breakdown of how task was performed in the field; the second SME validated the data provided in first interview; and the Instructor Review was conducted at Ft. Leonard Wood, MO., during the week of September 13-17, 1982.

Problems - No major problems were encountered while analyzing mine/countermine operations, field fortifications, and demolitions, as the SME had had recent field experience, was knowledgeable, and possessed adequate verbal ability. It was more difficult to complete analysis on the Bridging and River Crossing tasks. There seems to be a problem as to what the 12B soldier really does at the 10 level and how responsibilities are divided between 12B and 12C personnel in these two areas.

Problems in communication exists because the courses are written at Ft. Belvoir and instructed at Ft. Leonard Wood, MO.

Discrepancies - There are differences as to the role of 12B10 as seen by 12B and 12C NCO's. Some differences as to how task is listed in SM by Belvoir and how it is taught by instructional personnel at Ft. Leonard Wood.

Discrepancies were noted on the way task is performed in field and the procedure as given in SM. This was noted on MGB bridge particularly.

12B - 2

There are no 20 level tasks taught at Ft. Leonard Wood and there is no 20 level course later on, so all 20 level tasks must be unit trained. According to SME's, unit training quality varies from adequate to non-existent.

Proponency for Claymore Mine was transferred to Infantry School, Ft. Benning, GA. However, the task is still being instructed at Ft. Leonard Wood, following the Engineer School content.

Soldier's Manual - The task list from the March 1982 SM was used as a basis for the analysis. The SM gave the task title, task number and the major steps involved.

Personnel - The 12B personnel at Ft. Belvoir were extremely cooperative and helpful while performing as SMEs and Reviewers.

The 12C personnel used in cross-checking on Bridging and River Crossing tasks were generally non-committal and not very cooperative. Persistence by 12B personnel and the analyst finally got the job done.

The Ft. Leonard Wood 12B Site Personnel were very cooperative once the analyst was able to get down through the staff hierarchy to them.

Types of Knowledge Needed - The soldier needs to know task related terminology so that he can perform tasks at 10 level in a squad setting. Objects must be classified by size, shape and color.

Finger dexterity is needed to work with intricate mechanisms found in demolitions and mine/countermine operations.

The soldier does not use TMs or written aids, but takes verbal direction from squad leader in accomplishing most tasks.

MOS SUMMARY - 13B CANNON CREWMAN

Analysis: Approach - Most interview sessions were held in the office area provided to RCA Service Company. Occasionally interviews were held at the training area so the analyst could observe task performance. This was done most frequently for group tasks - those tasks requiring two to six soldiers. SME's were provided upon request through the point of contact. Replicate analysis procedures were used for tasks for which analysis was done in the following MOS: 11B, 12B, 15D, 15E, 19D, 19E, 55B, 64C, 95B.

Problems - Analysis was accomplished using a draft Soldier's Manual, dated 1981. A great number of tasks were duplicates - only the equipment changed, such as M-12 series or M-100 series. To accomplish analysis efficiently the task was analyzed first for one type of equipment, and replicate (duplicate) analysis procedures were used for subsequent types of equipment. A second major problem had to do with analyzing group tasks. A format was developed so each group member's activities were included.

Discrepancies - Most discrepancies were the results of incomplete task statements - no listing for tools, vehicles, or lubrication orders. Use of the log book was the responsibility of the section supervisor, as reported by SME's, not the 10- or 20-level soldier. Some tasks were selectively trained. For example, everyone was trained to emplace aiming posts, but only some soldiers were trained to align them.

Soldier's Manual - As described above a draft version, dated 1981, was used.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Little discrepancy in use was noted. For some replicate tasks from 19D and 19E the type of equipment, mainly machine guns, varied with the equipment used by the 13B soldier.

Types of Knowledges - In general, spatial orientation and environmental observation skills predominated. Also, basic skills in numeracy are required. Because of the crew nature of the MOS, receptive communication skills are important for the 10- and 20-level soldier. At the higher skill levels expressive communication scores become important.

MOS SUMMARY - 13E CANNON FIRE DIRECTION SPECIALIST

Tasks on M-36 chronograph are to be deleted, but school wanted the tasks analyzed. The M-36 is no longer taught in the school for 13E's. M-90 chronograph is to become a portion of the instruction of MOS 13B; M-90 is an item issued at firing battery level and the M-36 issued at division artillery level. M90 provides identical data as the M-36.

Tasks on computer set, field artillery general, T1-59 is taught only in Officer's Basic Course, not in 13E course. Planned 3-hour course possible will be increased to 8 hours in new 13E program of instruction. After interviewing several SME's, the analyst discovered a lack of knowledge and very little use of T1-59 in field units. Under revision is Ft. Still Reference Note (Jan. 80), a job aid, which is needed for nuclear and meteorology computation.

Duplication and reorganization of identical data from task to task is prevalent in Soldier's Manual 13E. An example of this is the repetitious use of equipment programmed for additional or continued tasks using field artillery digital automatic computer (FADAC) and the computer set T1-59. Tasks are duplicated by use of equipment. Data in the tabular firing table (book) is on the graphical firing table (stick) and on charts attached to the FADAC (computer).

Detailed instruction appears in numerous tasks but rarely used in field training such as direct fire procedures and use of M-10 plotting board, according to SMEs.

New materials or systems are not in the field nor is equipment for performance of tasks such as the Copperhead and the Battery Computer System.

Some forms for merely recording data obtained elsewhere are not needed in computer operations, since data is stored. Most forms are commonly called "idiot sheets" by SMEs. Form titles are not consistent in soldier's manual such as highburst/mean point of impact (HB/MPI) to only HB or MPI. "8-inch Nuclear Computation" is form title having two sections, the task calls the form name according to section utilized.

MOS SUMMARY - 13E CANNON FIRE DIRECTION SPECIALIST

The 13E MOS is a highly skilled and elite group within the artillery MOS. They are the fire direction center (FDC). The main job of the 13E is to calculate where an artillery round will land. This requires the elements of math of various kinds. In its purest sense, a 13E must be able to add, subtract, multiply, divide, use geometry, algebra, and trigonometry, in addition to working with decimals. The 13E must plot and update points reported to them by the forward observer and relay this data to the guns.

Most of what a 13E does involves looking up data in charts and tables. Sometimes these are relatively simple charts limited to locating a specification from an intersection of a row and column, but often requiring cross referencing between tables. Some tables require interpolation of the values. Slide-rules are commonly used to obtain information to relate to the guns. They require a soldier to align numbers precisely and to read values off a scale, often estimating between values.

In general the 13E MOS is a speed oriented MOS requiring high math skills. Very few tasks require mechanical functions except to manipulate and align slides and plotters. The Army is slowly and reluctantly switching to more electronic methods of fire direction control such as hand-held or hand-held calculators. These should take some of the mental burdens off the 13E and the slide-rules and other aids requiring exceptional math abilities.

MOS SUMMARY - 13F FIRE SUPPORT SPECIALIST

A soldier in the 13F MOS must be concerned with many areas of skills and knowledges. A few of these are essential to function effectively. The primary task a 13F must do is to spot and locate targets. Almost all other tasks rely on this skill. Several key components are contained within this spot and locate function. First a soldier must be adept at map reading and locating ground points on a map. This includes recognizing terrain features on maps, contour lines, grid coordinate systems, and measuring distances on a map. Second, a soldier in 13F must be able to estimate distances accurately from several kilometers down to a few meters. Third, he must be familiar with the MIL system of measuring angles and be competent at estimating angles. All of these skills are used to accurately locate, by coordinates, a target for the artillery.

Many of the tasks performed by a 13F are extensions of the primary task of locating targets. Radio communication skills and procedures are used to relay target information to the fire direction control (FDC). Encoding and decoding messages are used for security purposes. Bracketing and adjusting of guns requires some basic math in addition to estimating skills. Very little technical skill is required by a 13F but a great deal of practice to develop precise estimating skills is essential.

Very little technical knowledge is required of a soldier in 13F at this time. The only equipment generally used is binoculars, compass, map, radio, and sometimes a digital message device. The near future may see the forward observers with a complex vehicle with laser range finders and targeters, numerous radios, and other sophisticated items to use and maintain. With all the improvements, the forward observer's (13F) job will still be to locate targets, and provide information to them on direct artillery rounds.

MOS SUMMARY - 15D LANCE MISSILE CREW MEMBER

The 15D MOS is basically a labor related MOS. The soldier is concerned primarily with assembly and preparation of a lance missile. Many of the tasks require the soldier to manipulate and mate parts. There are very few tasks that involve mental processes, computations, or even much thinking. The tasks are basically mechanical in nature and some require considerable strength. Most tasks are just one portion of a team effort to prepare a lance missile for launch. Speed to complete the team effort is critical and minimum time standards have been established for many of the tasks. All 15D are trained in all tasks but when someone is particularly adept at a particular task that will become their assigned job in the team.

At the skill level II, a 15D assumes a bit more responsibility. Instead of the pure muscle tasks, the 15D now performs tasks involving finer alignments and setting. Adjusting and setting fuses and autocollimating devices on the missile, while still being basically mechanical operations, require fine manipulative skills.

Due to the sensitivity of missiles and nuclear warheads, a 15D is responsible for a great deal of safety and security. Numerous cautions must be followed and procedures to check and double-check settings before the missile is ready to fire are quite common. In addition, inspections and the perpetual stream of forms must be completed at regular intervals. These are most often done by a skill level II soldier.

MOS SUMMARY - 15E PERSHING MISSILE CREW MEMBER

Analysis Approach - Most interview sessions were held in the office area provided to RCA Service Company. Occasionally interviews were held at the training area so the analyst could observe task performance. This was done most frequently for group (crew) tasks - those tasks requiring more than one soldier. SME's were provided upon request through the point of contact. Replicate analysis procedures were used for tasks for which analysis was done in the following MOS: 13B, 15D, 26Q, 63N, 63 W, and 64C.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted.

Soldier's Manual - An undated draft version was used. The standards required in each task were referenced to technical manuals. SME's advised this was due to periodic revision of the Soldier's Manual.

Equipment - 15E contains equipment, programmer test set, and power station also used by MOS 21G, Pershing missile Maintenance Specialist.

Types of Knowledges - Spatial orientation and environmental observation skills predominated. Also, basic skills in numeracy are required. Because of the crew nature of the MOS, receptive communication skills are important for the 10- and 20- level soldier.

MOS SUMMARY - 16D HAWK MISSILE CREW MEMBER

The first MOS to be done - straightforward, with good SM, SMEs and job aids.

This is an MOS that does not call for any extraordinary skills and knowledges.

Some minor electronic skills, team work, strength, attention to safety inputs, ability to follow detailed procedures (crew drill) and ability to do a pressure job in a hurry (as preparing for action on march ordering the equipment), must be done within prescribed time limits. The 16D must know his limits and when to call for further assistance.

The coordinating problems with other Service Schools and the need to work through TRADOC apply. Much too torturous a route for something that should be simple.

The better 16D's in many cases cross-train as 16E's to enhance their promotion potential and their career progression. Of course, they are much more valuable to their unit when they can operate all of the HAWK equipment.

The actual training course in AIT suffers from a lack of motor transport, lifting apparatus and some other handling equipment so the 16D fresh out of school needs a lot more training that must be given at the first unit.

MOS SUMMARY - 16E HAWK FIRE CONTROL CREW MEMBER

The following comments were distilled from pertinent conversations.

Major skills and knowledges required are ability to follow detailed procedures (crew drill), work under pressure, teamwork, strength, march ordering, emplacement, ability to work with maintenance personnel, and identify and explain problem areas. Others include being able to recognize symbology, knowing when equipment is operating properly, being able to use complex communication equipment, reading scopes, interpreting and reacting to signals from other agencies, superior, lateral, and subordinates, and knowing when to call for help and assistance.

The Soldier's Manual was in draft form and was satisfactory except for the shared tasks that were incomplete. This is a recurring problem and was a factor in all analyses at this site.

There were many SME problems: no-shows, lack of pertinent knowledges, inarticulate people when it came to explaining tasks. It was a constant battle to stay even with the program. There seemed to be a shortage of "available" 16E's so it was a constant problem getting enough qualified people to assist us.

Recommendation for any future such efforts: attempt to nail down the Service Schools a little better. Those who were briefed by TRADOC never seemed to be the real participants.

MOS SUMMARY - 16H ADA OPERATIONS AND INTELLIGENCE ASSISTANCE

This MOS was scheduled to be analyzed first. No one was ready so it wound up being the last one. Even then, things (SM's, Job Aids, personnel) were not always ready.

The MOS is really a potpourri of many others. The operator portion of 25L, some 05B, some 63W (sic), some 71L and some others. The first course to train 16H under the new scheme of things is still in residence so there was no field feedback or any longitudinal experience to draw from.

The 16H must be a jack-of-all-trades: an operator of a complex Air Defense Coordinating System, a radio operator, a generator operator, a driver, and a clerk. So all the skills and knowledges required come from all these areas mainly being part of a complex team, having better than average coordination, visual acuity, and mental alertness to recognize all the sights and sounds of the AADCP.

The Soldier's Manual is a semi-disaster and the Air Defense School has requested and obtained permission for a 12-month delay to do another front-end analysis and to restudy the entire MOS and its supporting documentation. All of this occurred during the course of analysis.

A major problem with the Soldier's Manual is that the pieces that came from Signal, Engineer, Transportation, Administration, etc., must pass through a labyrinth created and manned by TRADOC so that the SME's at Ft. Bliss cannot deal directly with their counterparts at the other Service Schools. This compounds time, understanding and coordination problems. Just too many people in the process. In fact, there are numerous versions of a task with the identical number that pertained to the same piece of equipment, but were quite different in content.

This comment may apply to most any MOS, but the 16H with its content coming from so many other areas is particularly susceptible to an over-control problem. There are so many in charge, that really no one is in charge.

MOS SUMMARY - 16P ADA SHORT RANGE MISSILE CREWMAN

The analysis was done by two analysts. The following comment is distilled from various conversations as the work progressed.

Major Skills and Knowledges required are: ability to follow detailed procedures (crew drill), work under pressure - many times short-handed. React quickly to changes in situation - short time available to detect, identify, engaged, and destroy targets.

Know when equipment is operating properly - know when to seek assistance as necessary. Be able to use communications equipment - procedures, maintenance and be able to work with other agencies - superior, lateral, and subordinate.

The Soldier's Manual (1976 version still the official one) was a disaster: out-dated, many tasks had become incorporated into FM's 21-2 and 21-3. Draft manuals were in a constant state of flux. As of this date, they still are undergoing extensive changes.

SMEs had to be procured from first ADA Tng Bde which required many coordinating steps, all in writing - a simple chore was over-complicated. SMEs were however very competent and knowledgeable.

The Shared Task problem that surfaced in the 16H area applies as well for 16P. This has not been solved as of this date. By the time TRADOC guidance gets to the schools for implementation, the next round is being sent out.

MOS SUMMARY - 17B FIELD ARTILLERY RADAR CREW MEMBER

A problem exists in the plotting, as with the 17C. The students are taught the 3-point method with the boxwood scale and in the field either the metal coordinate scale or the plastic L-shaped scale is used.

The Soldier's Manual and the Trainer's Guide is not detailed enough for the soldier to complete a task, especially the air lifting and rigging tasks. The soldiers are not tested on these tasks and only see films covering air lifting.

All the soldiers (17B) are not trained on the AN/TPS-58 radar; only a selected number receive this training. Those TPS-58 units in the U.S. and in Germany actually perform most of the TPS-58 tasks. The units in Korea never move the sets which are emplaced on the DMZ. This also applied to the AN/TPS-25 radars. The only place the MEP-017A generator is used is in Korea and there only as a back-up. The MEP-025A is used worldwide. There is one task on the 025A and two tasks on the 017A.

There is no field training in the radar course. The complete course is self-paced and conducted entirely at the counter-fire department. Many of the tasks cannot be performed by only one individual and many are not performed by the students during the course, (march order, emplacement, registrations, etc.). When the student completes the course, he has received an introduction to radar and radar operations, but wouldn't be considered a competent operator as stated by most of the instructors at Counter-fire department.

The conditions, standards, and performance measures on many of the tasks are exactly the same, although some of these shouldn't be the same. The equipment listed in the task, as required for task completion, is not complete.

Currently, and for approximately five MOS, there has only been one 17B at the SQT branch. He is not qualified on the TPS-58, has never operated the set, or supervised a TPS-58 section. Yet he is responsible for putting out test products on this equipment.

MOS SUMMARY - 17C FIELD ARTILLERY TARGET ACQUISITION SPECIALIST

MOS 17C seems to be undergoing a change in equipment and personnel. Many new systems are being introduced into the MOS, which were not analyzed. (AN/GRA-114 data link, variable format message entry device (VFMED), Digital Message Device (DMD)). Many of the personnel assigned to the MOS have been reclassified into the MOS. The 17C personnel working in SQT Branch do not seem to be qualified because they were reclassified. When they were asked questions on many of the tasks or pieces of equipment, the answers were, "I've never seen that piece of equipment", or "I've never done that in the field". These people are SFCs/E-7s and in a field unit would run an entire 17C platoon!

The instructors at the school (counter-fire dept.) do not seem to know which tasks are taught and which are not taught. I have three different lists of tasks which are BSEP I and BSEP II tasks. I had to get the final list from the Government Civilian in the department.

There is a discrepancy in the way plotting is done. The students are taught the 3-point method using a boxwood scale but in the field they use a metal coordinate scale or the L-shaped plastic scale. They do this because it's a much faster method of plotting.

The soldiers are taught how to do a task but never why. Until he is very familiar with the task, if the soldier is interrupted, he will return to the beginning of the task and not at the point of interruption for task completion.

MOS SUMMARY - 17K GROUND SURVEILLANCE RADAR CREWMAN

I. Problems, General

- A. Three models of AN/PPS-5 caused some difficulty in write-ups
- B. Lack of knowledge on some equipment by "desk-bound" SMEs caused some trouble in write-ups, to include:
 - 1. multimeter, TS-352 B/U
 - 2. AN PPS-15 radar because of being newer equipment
- C. Shortage and available time of instructors
 - 1. When available however, were excellent

II. Discrepancies, general

- A. None noted

III. Observations of Soldier's Manual

- A. Some references incorrect on final draft
- B. No task on ECM or ECCM on radar equipment (non-communication)
- C. Brought to attention of POC that there were duplicate task numbers in final draft, which was in camera ready format
- D. Some equipment indicated in "conditions" not required for task
- E. Some common/shared tasks do not fill needs of 17K e.g., ECM/ECCM

IV. Observations of equipment

- A. Available in quantity

V. Observations of personnel

- A. Assistance was excellent in most areas, except IB above
- B. Instructors in general, and especially one individual, were superior

17K - 2

VI. Depth and type of knowledge required

- A. Good grasp of basic math, e.g., add, subtract, divide, and multiply in whole/decimals or fractions
- B. Basic electronics would be extremely helpful along with radio wave propagation
- C. Good mechanical aptitude

MOS SUMMARY - 19D CAVALRY SCOUT

Analysis Approach - Site supervisor decided on a group approach to analysis of the MOS, assigning tasks to all three analysts. Interviews were held in the office with trips being made to view equipment components prior to/during analysis as desired; soldiers were on hand to answer questions and explain operations.

The ETAP manual was helpful in training at the startup of the project; it was not used by our group during analysis.

Major Problems - Twenty working day lead time to obtain SME 2/Instructors at the outset. Problem was alleviated when we volunteered to go to the SMEs; POC seem surprised, when we volunteered, that we were willing to go to the personnel.

Discrepancies - Inclusion of tasks which are done so rarely by 19Ds that SMEs were hard to find (e.g., booby trap tasks and several of the demolition tasks, which are ordinarily performed by engineers; several of the radio tasks).

Inclusion of a number of supervisory tasks which, as written by proponent, are at an inappropriate level for SL 1 and 2 soldiers. SMEs said tasks were included because 19Ds need the skills which are being supervised and there are no appropriate tasks available for the skills themselves.

Soldier's Manual - Tasks written by other proponents vary considerably in completeness, level of specificity, and applicability to 19D soldier. SMEs said that proponents had been informed that certain tasks, as written, are inapplicable; but proponent refused to modify or to permit Armor School to modify task to fit.

Confusion in a number of tasks over what constitutes a performance step and over difference between standards and performance steps. Background information is presented fairly often as a performance step rather than as an explanatory note.

Equipment - With respect to certain radio tasks, several SMEs (E6s and E7s) admitted they were unfamiliar with the particular radio.

Personnel - Cooperative. Knowledgeable in most tasks (exceptions noted above). SMEs could not identify major steps unless led.

Depth/Type of Knowledge - Reference and reading skills on a rather low level, form completion, and operation of a wide range of equipment.

MOS SUMMARY - 19E M48-M60A1/A3 ARMOR CREWMAN

Analysis Approach - Site supervisor decided on a group approach to analysis of the MOS, assigning tasks to all three analysts. Interviews were held in the office with trips being made to view equipment components prior to/during analysis as desired, soldiers were on hand to answer questions and explain operations.

The ETAP manual was helpful in training at the startup of the project; it was not used by our group during analysis.

Major Problems - Twenty working day lead time to obtain SME 2/Instructors at the outset. Problem was alleviated when we volunteered to go to the SMEs; POC seem surprised, when we volunteered, that we were willing to go to the personnel.

Discrepancies - Redundancy of tasks among three different tanks, i.e., separate tasks for M48A5, M60A1, and M60A3 covering procedures which are essentially alike.

Inclusion of several tasks with limited application probability, i.e., M551 Sheridan is found only at Fort Bragg and is being phased out; M73/M219 machineguns are obsolete.

Soldier's Manual - Tasks from other proponents vary considerably in completeness, level of specificity, and applicability to MOS 19E. Armor School's efforts to modify some tasks for better fit have been rebuffed by some proponents.

Heavy reliance in some tasks on TM references. The TMs for the M60A1 series tanks are well-illustrated and generally easy to follow; so the referencing probably is more useful than written descriptions would be.

Inclusion of separate group of five tasks for M48A5 seems of questionable value since, in general, the M48A5 (which is used in Korea and by National Guard units) functions like M60 series tanks.

Equipment - Thirty-one tasks were deleted because the M55A (Sheridan) is being phased out and is no longer appropriate to the MOS.

M73/M219 machinegun tasks are not taught because these weapons are being phased out due to the superiority of the M240.

19E - 2

Personnel - Cooperative, knowledgeable. SMEs could not identify major steps unless led.

Depth/Type of Knowledges - Knowledges required for the MOS include locating information in the TM for the equipment and following TM instructions for conducting PMCS and troubleshooting. Other knowledges/requirements include filling out forms and performing tasks both individually and with a crew.

MOS SUMMARY - 24C IMPROVED HAWK FIRING SECTION MECHANIC

Of all the MOS analyzed at Ft. Bliss, the 24C effort went the best.

This was due to a number of factors: the Draft Soldier Manual, although late, supplemented the task list and Job Performance Measures (JPMs); the SME's were the most knowledgeable, most cooperative and most available of any of the SMEs; they could place themselves into the role of the Level 1 and 2 Soldier and approach the various tasks from the viewpoint.

The 24C as part of his AIT is first trained as a 16D HAWK Missile Crewworker prior to entry into the Technician course. This extra knowledge and skill helps him appreciate the point of view of an operation and enables him to use the operator as an assistant when required (2-man role application).

The 24C must be able to think logically, analyze symptoms, read and understand directions, read meters, dials, indicator lights and understand proper and/or improper readings.

The 24C must know parts locations on equipment, on schematics, and in the parts manuals. He must know supply procedures, forms, and when parts may be obtained.

The 24C must be able to perform troubleshooting by Branch and Flow (B&F), Fault Isolation Procedures (FIP), and Logic Methods. This requires that he read schematics after finding the proper ones, detailed or general, with associated symbology and logic.

He must have manual dexterity, strength, the ability to work in close quarters around high voltages and the knowledges and skills to bypass interlocks.

The 24C must know and apply safety precautions concerning himself, the equipment and others.

The 24C must be able to interact with others: superiors, peers and subordinates in such a manner that the required job gets done. Many tasks performed by a 24C have extreme time limitations and constraints so that a sense of humor and patience are essential.

The 24C MOS is highly synergistic (the sum total of all skills and knowledges is much greater than the sum of all the individual parts that are taught). The successful 24C must continue to grow and build upon the base constructed in the Service School if he is to be of value to himself and his unit.

MOS SUMMARY - 24H IMPROVED HAWK FIRE CONTROL REPAIRER

Analysis Approach - After much discussion with 24H SMEs it was decided that to analyze the myriad of possible repair problems, troubleshooting techniques, etc., the best approach was to develop a model format for Skill Level 1 and Skill Level 2 tasks that remained to be analyzed. The models were, in their opinion, a more realistic method of laying out a routine which may vary from person to person. The models were then filled in with appropriate references which are both a resource and a job aid to the 24H. Any special problems or knowledges were entered in the area they would be encountered in the format.

Problems Encountered - None

Discrepancies - None noted.

Observations of Soldier's Manual - Probably the best I've seen, laid out and referenced well.

Observations of Equipment - Seems to be ever improving and some will be obsolete when our job is finished.

Observations of Personnel - The three men I had the pleasure to work with were some of the best trained people I have ever met. They showed a definite interest in the project and expressed the hope that it might bring a better starting product to their field.

Depth and Types of Knowledges to do Job - In general, the student should possess a good, if not above average, grasp of the following: common sense (hard to test), math (trig. at least), read well, be able to use tools, have a working knowledge of electronics.

Be able to work in odd positions (upside down on back), be able to lift at least 100 pounds to about 3 feet.

MOS Summary - 26L TACTICAL MICROWAVE SYSTEMS REPAIRER

Analysis Approach - Analysis planning began June 5, 1981, with analysis start date scheduled for June 12, 1981. The estimated completion date was set for August 20, 1981. The location where analysis took place was in the course area with the equipment. Final write-ups and reviews took place in room 211 of Brant Hall (contractor location). The RCA analyst and the school analyst met with the course chief at the 26L course area to discuss methods and procedures for analysis. During the planning session, officials at the course agreed to provide qualified SMEs with field experience on a daily basis for four hours per day. A list of tasks deleted from the Soldier's Manual was provided to the RCA analyst. No further training analysis pertaining to those systems was conducted by the activity, due to equipment being phased out of the Active Army Inventory. There were no common nor reserve component tasks on the task list to be analyzed.

Problems/Discrepancies - The RCA Analyst reported no problems in getting qualified SMEs for analysis. Task dealing with the Radio Terminal Sets AN/TRC-129A, AN/TRC-132A, and AN TRC-80B were dropped from analysis because of their low density in the Army.

Soldier's Manual - The RCA Analyst used the Soldier's Manuals to obtain task titles and task numbers for analysis write-ups. However, outlines in the manual could not be used as guides for task write-ups because the major steps identified by the SME were not always the same as those identified in the Soldier's Manual.

Equipment - The equipment density of Radio Terminal Sets AN/TRC-129A, AN/TRC-132A and AN TRC-80B was determined by a phone conversation between Sgt. Randolph and Mr. Joe Silva on August 13, 1981. The gist of the conversation follows.

1. There are only 2 Radio Terminal Sets AN/TRC-129A in the inventory. They are here at Ft. Gordon and are being utilized by ICTS as circuit conditioning loop back terminals. There is no MOS 26L training on this equipment and none is required.
2. There are currently 14 Radio Terminal Sets AN/TRC-132 in the inventory. Twelve are at Ft. Huachuca and the other 2 are at Air Force Base in Massachusetts. Recommend unit training.
3. There are a total of 36 AN/TRC-80B's. 33 are in Europe, and 3 are at Ft. Sill. (These are currently being turned in or being cannibalized as obsolete). Recommend unit training until all are out of the system.
4. Tasks pertaining to the AN/TRC-132A are not in the coordinating draft of the new Soldier's Manual because of the low density of equipment (only 12 are left in the Army inventory).

26L - 2

In view of the above information, all tasks listed on the RCA memo will be deleted from the 26L Soldier's Manual. These tasks were dropped from RCA analysis.

Personnel - All personnel at the 26L course were cooperative. Knowledgeable SMEs with field experience were provided on a daily basis for four hours per day. Course instructors served as verifiers and reviewers.

Types of Knowledges - The 26L soldier needs to have all the skills that the 26Q soldier (Microwave Operator) has. He/she should be able to number and count, read gauge measures, compute or perform using addition and subtraction/multiplication and division facts. He/she should be able to read and follow procedural directions, read reference materials (TM's, tables/charts, illustrations, maps, schematics, etc.) to gain access to information for completing a task activity or for selecting a course of action. Completing and using completed forms to locate or compare information is a very necessary skill of the 26L soldier. Above all, knowledge of safety and security precautions is very important to avoid hazards or prevent injury to self and/or equipment.

MOS Summary - 26Q TACTICAL SATELLITE/MICROWAVE SYSTEMS OPERATOR

Analysis Approach - Analysis planning began June, 1981. The RCA Analyst and the school analyst met with the course chief at the 26Q course. During pre-analysis planning, methods for analysis were discussed. It was decided that the course would provide SMEs for four hours daily. Analysis took place in Brant Hall (Room 211) and at equipment site locations, building 29811, OT 28.

Problems/Discrepancies - No problems were encountered during the analysis of the 26Q MOS.

Soldier's Manual - The RCA analyst used the Soldier's Manual to obtain task titles and task numbers for analysis write-ups. However, outlines in the manual were not very helpful as guides for task write-ups because, in some instances, major steps were not properly identified.

Equipment - Many of the tasks in the 26Q MOS were deleted due to the fact that the equipment was obsolete.

Personnel - SMEs were generally cooperative, courteous, and extremely knowledgeable in their field. Although instructor shortage existed, SMEs were always provided for analysis and verification.

Types of Knowledges - The 26Q soldier needs to be able to number and count, use units of measurement, and read and interpret gauge measures. He/she must be able to read and follow directions as well as be able to use reference materials, tables and charts, illustrations and diagrams to gain access to information relevant to the MOS. Completing forms and using completed forms to locate or compare information are also necessary skills required of the 26Q soldier. Identifying and observing precautions relating to safety and security are important knowledges required for the 26Q soldier.

MOS SUMMARY - 27E TOW/DRAGON REPAIRER

Analysis Approach - Interviews for 27E (Tow/Dragon Repairer) were held solely in the office space provided RCA Service Company (Building 3344) which was convenient to the work site of the SME and in which SMEs were comfortable.

Providing SMEs was a burden on the providing agency due to shortages of the MOS. Interviews were adjusted to SMEs schedule. Cooperation and support were excellent.

Problems - The analysis of tasks of this MOS was made solely from TMs and interviews, not from field observations. This in itself was not a major problem as the MOS works within a standardized workshop-van and works within the procedures of the TMs.

The SME attitude reflected a desire to present the "school position or solution." The undetermined problem is how well this reflects or hides field experiences such as poor sequence or lack of special tools or parts.

Soldier's Manual - The current Soldier's Manual was dated 23 July 1982. After the analysis began, the changes did result in some confusion over which tasks were to be considered.

This Soldier's Manual was frequently too broad in performance measures. Typically, they were "1. Do the disassembly steps. 2. Do the repair procedures. 3. Do the assembly steps."

Often Repair, Alignment, Troubleshoot type tasks had the same first and third steps when the task required the item to be whole. At times, the sequence of tasks was not logical. Troubleshooting following Alignment and Repair, when it appeared that Troubleshoot, Repair, Alignment would be the sequence in the field.

The Soldier's Manual gave excellent references and condition statements.

Equipment - This MOS works in a specific shop designed and equipped to service the Tow/Dragon weapon components and the associated accessories.

Personnel - More personnel would have been advantageous. The limited number did not delay the completion of the analysis process.

Types of Knowledges - The 27E Soldier must read well, comprehend technical manuals, and sophisticated electronic repair. He must replace electronic components of a complicated nature. He works with items and components both sensitive and delicate. He uses test equipment. He must be exact in reading and in making adjustments to equipment. Basic math skills are needed. Reference skills are required daily.

27E - 2

Analysis Approach - The ETAP Manual was a good reference/guide. When SME indicated the task was completed exactly as detailed in TM, details were taken from TM and then confirmed. The substantiation - verification - instructional review processes seemed to be necessary and valuable. No problems developed requiring RCA action - schedule problems resulted in no loss of time. There was always something else to do.

MOS SUMMARY - 31J TELETYPEWRITER REPAIRER

Analysis Approach - All interviewing was done in the 31J Course area, allowing access to specific equipment for technical details. Generally, interviewing was confined to afternoons, but some tasks became so involved that all-day sessions became necessary. An SME was chosen for the equipment to be analyzed, as no one SME could be used for all. The procedure to be used was explained to the SME, and, after some trial and error, a systematic troubleshooting procedure was developed and pursued. Verifiers were chosen for their expertise in operating a particular piece of equipment. The course and section chiefs were conscientious providers and if a particular person was requested, he was provided. Supervisory personnel were very knowledgeable about the equipment and SME quality. All were very cooperative and professional. The verifiers were thorough and capable.

Problems - A major problem was a shortage of instructors, especially for unusual pieces of equipment. The course chief was especially helpful in providing people when problems were encountered. A secondary problem encountered was due to the fact that whenever a new person was needed for a different piece of equipment, the analysis rationale and procedure had to be explained and the system for troubleshooting had to be developed all over again. This took time, and some times we had to regroup and start over, once a more comfortable system emerged. The longer the analyst was involved with the course, the easier it became, because the "new" SMEs used later in the analysis were more aware of the project. Thirdly, a problem was encountered as to determining the level or type of maintenance involved. Each "shop" in the field is run differently, depending on personnel or mission. The type of shop determines test equipment availability and method used for repair. Basically, the analyst chose to attack the task as the SME had performed it in his experience or the setting in which the equipment was most often found. There is no clear cut delineation of skill level I and II. Once the SME chose the setting, he was able to proceed and structure their responses accordingly. The lines of communication had to open between the SME and the analyst with a great deal of sensitivity on the analyst's part not to be pushy, and to be respectful of the SME and his part in the analysis--people don't ordinarily think in the realm necessary to troubleshoot.

Discrepancies - Methodology of troubleshooting is a personal experience for each repairman. Each has his set of procedures determined by experience with the equipment involved. Generally speaking, the end result was the same, but the procedure involved for solving the problem could vary, sometimes drastically. Even so, a verifier could track the procedure used fairly easily, but it was difficult to change SMEs in the middle of a task without losing time and having to redo what was analyzed. If an SME had to be gone for awhile, the analyst would select another task for a different SME. Some problems (symptoms) were more universal than others, especially with the older equipment and fewer discrepancies arose between SMEs and became noticeable between TMs and SMEs. The SMEs would give certain specifications for adjustments per specific components. In reality, the older the equipment was, the more the

parts became worn, the less a repairman could rely on those specifications and the more he had to rely on his knowledge of the system of operation of all mechanisms involved.

Soldier's Manual - The Soldier's Manual was not much help, in fact, the task performance standards were more confusing than helpful. Even the titles were misleading. We had problems separating the troubleshooting and repair tasks, realistically. By the time you have gotten to the point of isolating the trouble, you fix it. This made the analysis artificial, until a method was developed whereby the troubleshooting and repair was done as in "real-life" in the troubleshooting task and references only were used in the repair task.

Equipment - The "bread and butter" of the 31J repairman is taught in the course, hands-on, with limited use equipment being reserved for on-the-job training. Test and tools are instructed except for some new equipment not yet available. However, an experienced repairman rarely uses all the tools, relying on his trained "eye" for measuring specifications and knowledge of how parts work together to correct problems. Much of the equipment is similar according to the manufacturer, teletypes made by Kleinschmidt use much of the same components and adjustments, while those manufactured by Teletype Corp. have a different set of characteristics relative to each other. It seemed to the analyst that if a repairman had experienced with one, and was familiar with electronic and mechanical theory, he could effectively work on another using the TMs. Because of time, the equipment used in training is modified and stripped and practice is limited to the more available kinds of adjustments.

Personnel - Except for specialized or new equipment, no problems were encountered as to availability of SMEs. SMEs were cooperative, competent, and sincerely interested in participating. Pleasure was expressed in the fact that they were being consulted, and their experience was desirable.

Types of Knowledges - In general, the knowledge of electronic principals and mechanical operations were the most important. One of the SMEs was hesitant to use the TMs or to read anything, but was quite capable and informative. An interesting point discovered was that the instructors were very much aware of the reference and paragraph number and used it to discuss lessons with the student, but in reality, rarely used the TMs on the job. Reading and use of schematics are important. The soldier can glean from a schematic and electrical theory all that is necessary to know as long as he has the equipment handy. Terminology is not as important for the repairman as it was for the analyst. In order to describe the procedure, we had to use the technical vocabulary while the repairman needed to know its function. A knowledge of math - especially measurement skills - is necessary, but more in a functional way are the calculations. The repairman especially needs to know what a very small measurement looks

312-3

like, for example...0003". Betweenness was also important. Reading is necessary when problems are encountered that experience cannot solve. It seems that a repairman "tinkers" first, and reads only when nothing else works. Even then, key phrases and information is selected because of a background in electronics and mechanics.

Instructional Review - This was the first MOS in which the new instructional review procedure was used. Fortunately, the supervisory personnel selected had a lot of experience in all the sections of the course and so the review went very smoothly.

ETAP Manual - The ETAP Manual wasn't used, but the procedures were as practiced at the training session. Procedures have been modified to suit the personality of the analyst, only as to the formality of the procedure.

MOS SUMMARY - 31M MULTICHANNEL COMMUNICATIONS EQUIPMENT OPERATOR

Analysis Approach - Analysis planning began November 3, 1981. Analysis start date was November 4, 1981. The RCA analyst and the school analyst met with the Course Chief and his assistant at the 31M course. During pre-analysis planning, methods for analysis were discussed. It was decided by the group that a weekly list of tasks to be analyzed would be provided to the course chief by the RCA analyst. Course officials certified that those tasks would be supported with SMEs during that week. Interviews for analysis were held at the 31M course (room 205 of Burkhardt Hall). Analysis write-up took place in room 211 of Brant Hall. Analysis verification and instructor review took place at the 31M course and in room 211 of Brant Hall.

Problems/Discrepancies - No major problems existed during the analysis other than SME "burn-out" due to instructor shortage.

Soldier's Manual - The Soldier's Manual was used only to obtain task numbers and task titles. The outlines could not be used in task write-ups because they did not reflect the major steps in the procedures as described by the SMEs.

Equipment - The majority of the equipment used in the 31M MOS was available at the course for task demonstrations by SMEs.

Personnel - Despite instructor shortage, SMEs were always provided for analysis and verification. Usually, the SME verifier was able to do the instructor review. All personnel at the 31M course were extremely cooperative and courteous. SMEs demonstrated a thorough knowledge of communications systems.

Types of Knowledges - The 31M soldier must possess quite a variety of skills and knowledges. He/she must be able to synthesize information from written sources which may contribute to the completion of a task activity. The 31M soldier must have the skills necessary to identify, select and use appropriate reference materials (tables, charts, illustrations, and schematic diagrams) to gain access to information pertinent to the task at hand. He/she must have the necessary skills to complete forms and to use them to locate or compare information. Above all, the 31M soldier must use common knowledge to prevent safety hazards and to minimize any safety or security problems.

MOS SUMMARY - 31N TACTICAL CIRCUIT CONTROLLER

Analysis Approach - Interviewing was mainly conducted in the morning with 31N SMEs at Willard Training Area. An SME was chosen or assigned to assist in analyzing all tasks. If and when tasks came up that were concerning equipment the SME was not familiar with, we went to the site of that equipment or to an experienced person for assistance. Verification was often done in a small group with two or three people participating.

Problems - A major problem occurred when the original SME was assigned elsewhere and new people were made available. The new SMEs were never really sure what was expected or how much time was demanded of them. At Willard they were still available to the students and sometimes this caused interruptions. This was further compounded by the fact that the analysis was started and then stopped, when the first analyst left and another analyst was assigned.

The civilian responsible for 31N training at Willard was extremely cooperative and helpful, both technically and as a supervisor. There are very few military people involved in the training of the 31N. At the classroom part of the course there are no military instructors and only military presence was an NCOIC.

Discrepancies - There is quite a bit of difference between how the task is performed in the field and how it is taught in the classroom. This is caused by the actual intent of task. SMEs stated that organizational maintenance is not a responsibility of the 31N operator, even though much of the task is performed by the operator as a part of daily preventive maintenance. DA Form 2407 is not always the responsibility of the 31N operator and DD Form 314 is not usually available either as a reference or to be filled out. The Master Station Log does not always exist as such, but the same information is recorded in the "cash book". The Cable Diagram is rarely available to the operator, but similar information is recorded as cables that are connected, on a bulletin board in the patching shelter.

Soldier's Manual - The Soldier's Manual was very helpful for many of the tasks. It provided a good guide for major steps and was usually correct. Only problems occurred with the "Check and Inspect" tasks as they just stated the same information as the parent task. In reality, the operator checks and inspects - there are no team chiefs or other supervisory personnel who perform the task, per se, on a regular basis. Some information in the body of the task related to other MOS but was not really identified as such. This was helpful to the operator in performing the task, but was not a 31N responsibility.

Equipment - Most all equipment was available and was taught at some point in the course, as part of a self-paced program of instruction. The procedures used to connect circuit to circuit

3114 - 2

all systems are all basically the same, no matter which patch panel is used, except for the TSQ-84. The TSQ-84 is an interim piece of equipment used in situations where other equipment will not work as well. It has some standard items and test equipment not available with shelters.

Personnel - Personnel were knowledgeable and competent.

Types of Knowledges - Knowledge most difficult to pinpoint was the knowledge the 3114 to know in relation to other MOS. Since he is part of a large system involving other MOS personnel connected to his equipment, it is helpful to know what they are doing. Knowledge of types of circuits, signals, and the language of other systems is helpful.

Instructional Review - Instructional Review and Knowledge Analysis were done using material from both the classroom part of the course and Willard, the field site.

ETAP Manual - After one and one half years of ETAPping, the manual was not used, but course the procedures were.

MDS SUMMARY - 31V TACTICAL COMMUNICATIONS SYSTEMS OPERATOR/MECHANIC

Despite a shortage of instructional personnel, Subject Matter Experts (SMEs) maximized responses and participated in the analysis project without reserve. Overall analysis strategy focused on coordinating skill level 1 tasks and skill level 2 tasks from Soldier's Manual FM 31V 1/2 into an integrated modular systematization, by organizing residual informational components and fragmented informational inputs into a well-balanced presentation.

The communication school's shortage of instructional personnel has caused a disproportionate student-instructor ratio; according to SMEs, 31V 10/20 students matriculated under extant circumstances receive a minimum of individualized training; thereby, realistic hands-on laboratory training capabilities relative to technological access diminish radically. Missing is the immediate and optimal feedback recognized by educators as critical to student motivation and goal maintenance. Many students experience reading comprehension difficulties (according to SMEs, some students cannot read, at all), making the efficacy of their self-paced mode of instruction questionable. A reciprocal cost-benefit relationship perhaps is unachieved.

SMEs offer the opinion that this self-paced instructional program must be dropped in favor of a return to a lock-step instructional program. They contend that a principal benefit of a lock-step program is a viable control exercised by instructors over academic discipline. They also suggest diagnostic screening for entry-level soldiers characterized by a kind of inquisitiveness, those with patient and analytical personalities; for such kind of people, so they say, hold promise for becoming fine repairmen.

In order to develop a theoretical understanding of applied electronics, at the outset of their training all 31V 10/20 soldiers perform a four-week long block of classes referred to as enabling exercises. Yet neither the skill level 1 nor the skill level 2 tasks included in FM 31V 1/2 comprise a monitor per se that checks mastery of this theoretical understanding; the student's understanding is assumed to have increased, say the SMEs, otherwise the students could not perform the soldier's manual tasks. Because the 31V Extended Task Analysis Procedures (ETAPs) reveal several examples of how skill level 2 tasks duplicate performance measures found in skill level 1 tasks, the analyst suggests scrutinizing these enabling exercises as a source of empirical data which may become the basis for new tasks -- to replace the deadspace now occupied by duplication.

One major problem encountered during analysis resulted in deleting several tasks from analysis, because they are security related. Another major problem was the unavailability of major equipment as follows: AN/VSC-2 and AN/VSC-3 teletypewriters, and AN/PRC-74 radio.

All SMEs requested a copy of ETAP results, acknowledging the usefulness of the final product and the analytical approach.

MOS SUMMARY - 32D STATION TECHNICAL CONTROLLER

Analysis Approach - Analysis planning began October 29, 1982. Government Furnished Materials were delivered to RCA on January 5, 1982. Analysis start date was planned for November 2, 1981, but was changed to January 25, 1982, due to having to analyze the 31M course first. SMEs were provided for analysis four hours a day or more, four days a week. Review SMEs were provided as needed for up to four hours a day, once a week. Analysis took place at site location of equipment and in room 211 of Brant Hall.

Problems/Discrepancies - No major problems were encountered during the analysis.

Soldier's Manual - The Soldier's Manual was used only to obtain task titles and numbers.

Equipment - Some of the equipment used to analyze the tasks in 32D were in eight vans (less than 1% density) army wide. These vans are not being used in the field and may be totally replaced by the 84 van. No SMEs were available at Fort Gordon.

Personnel - SMEs were generally cooperative, courteous, and very knowledgeable. Although instructor shortage existed, SMEs were usually provided for analysis and verification. Usually the verifier was able to do the instructor review, thus avoiding time loss during analysis.

Types of Knowledges - The 32D soldier must be able to use time-telling measures and gauge measures. He/she must be able to add and subtract, multiply and divide. He/she must be able to solve simple algebraic equations with one unknown. In the 32D MOS, it is often necessary for the soldier to synthesize information from written sources which contribute to the completion of a task activity. He/she must be able to use reference materials, tables and charts, illustrations, and diagrams to gain access to information relevant to the MOS. The soldier must be able to complete forms and be able to use completed forms to locate or compare information. The soldier must be able to communicate well verbally with other individuals when working on a task. The soldier must be able to use and apply common knowledge to avoid hazards to prevent injury to self or equipment.

MOS SUMMARY - 32H FIXED STATION RADIO REPAIRER

Analysis Approach - During pre-analysis planning, an SME from the course looked over the list of tasks to be analyzed and explained that the names of some of the pieces of equipment have been changed. For example, the radio receiver R-390 A/URR has been modified and is now called the radio receiver R-1981; the single sideband converter CV-157/URR is now known as converter C/-3300; the radio frequency oscillator O-1706/TSC-25 is now synonymous with the WMA-2 exciter. The SME identified simpler tasks to be analyzed first so that these could serve as building blocks for longer and more complicated tasks which were to be analyzed later. For example, the SME identified the pieces of equipment that go together to make up the Communications Central AN/TSC-25 (the radio receiving set AN/FRR-40/41, the radio transmitting set AN/FRT-53A, (the telegraph terminal AN/FGC-77/61A.) The operate, trouble-shoot, align, and repair tasks, dealing with each piece of equipment comprising the AN/TSC-25, were analyzed first before dealing with the Communications Central AN/TSC-25 tasks. This same procedure was followed in the analysis of the radio set AN/FRC-93.)

Interview sessions were generally held 3-5 days per week utilizing one SME per session. SMEs were provided for task verification and instructor review.

If equipment was available at the course, SMEs usually demonstrated procedures during the interview which made identification and location of parts and components easier to explain during the write-ups.

Problems/Discrepancies - No major problems were encountered, although instructor shortage created SME "burnout". Obtaining accurate, appropriate, and updated technical manuals for the equipment used in the MOS was a problem at times. Some of the equipment taught at the course is no longer used in the field. SMEs stated that often equipment used in the field is not actually repaired by the 32H repairman. Private contractors are usually called in to do the repair work. Not all the tasks on the task list were taught at the school. This made finding qualified SMEs difficult.

Soldier's Manual - The December 1981 draft was used during analysis. It was not very helpful as a guide for task analysis write-up because at times it listed inappropriate equipment for task performance and frequently major steps were not properly identified.

Equipment - As was stated above, most of the equipment taught at the course is no longer used in the field.

Personnel - Despite instructor shortage, SMEs were always provided for analysis and verification. Usually the SME verifier was able to do the instructor review, thus avoiding time loss during analysis.

32H - 2

All personnel at the 32H course were extremely cooperative and courteous. SMEs demonstrated a thorough understanding of communications systems and field services experiences. Their excellent ability to articulate technical information in plausible terms enabled the analyst to proceed effectively without contract delay.

Types of Knowledges - SMEs must be thoroughly familiar with all test equipment used in the MOS (multimeter, signal generator, oscilloscope, spectrum analyzer, etc.). They must possess thorough knowledge and understanding of basic electronics. They must be able to read gauges and meters as well as be familiar with tools used to adjust, align, tune and repair electronics equipment. They must apply certain preventive measures prior to task performance to minimize any potential safety or security problems. They must be able to read and apply information found in the various technical manuals (read and interpret wire diagrams, schematic diagrams, and charts). They must be able to recognize task-related words with technical meanings. They must be able to use formulas to solve mathematical problems and they must be able to complete forms and use completed forms to locate or compare information.

MOS SUMMARY - 33S EW/INTERCEPT EQUIPMENT REPAIRER

Analysis Approach - Interviews were conducted in front of equipment which facilitated the detail required. The equipment was stationed in Classroom labs with four systems in secured areas. Generally, interviews were held with one SME per system/piece of equipment. Tasks were grouped around systems/pieces of equipment. For each system/piece of equipment, 3 tasks were defined as Troubleshoot XXX, Align XXX, Repair XXX. These task definitions were found to be inaccurate of what was actually being accomplished, and somewhat contrived in drawing lines of distinction between them. For example, Repair XXX is normally accomplished in the performance of Troubleshooting XXX. To separate these as distinct tasks is misleading and difficult to describe. Also, alignment is the natural consequence of Preventive Maintenance Checks and Services (PMCS). However, PMCS is not included in any task definition, and yet it is routinely performed by "33S" at the organizational level of maintenance.

Problems Encountered - The first and foremost problem was that of creating a useable task list. Additions and deletions occurred to the task list throughout the analysis. 33S as a MOS is on the threshold of total reorganization. This one MOS will be split into 5 MOS within two years. Further, the equipment inventory a "33S" is expected to service is 2500 pieces of electronic equipment. This inventory is in dynamic change always as the state of electronic technology becomes more and more sophisticated. So arriving at a reasonably representative task list was a task in itself. It should be noted military personnel remained cooperative and helpful throughout this process. They seemed eager for any assistance.

Secondly, several pieces of equipment were classified, limiting the amount of analysis released on them to RCA headquarters. However, there were no variations of basic skills and knowledges on this equipment from that other equipment analyzed more fully and completely.

Discrepancies - None.

Soldier's Manual - The existing Soldier's Manual was hardly used inasmuch as it contained out-of-date equipment and procedures.

Equipment - None.

Personnel - None.

Types of Knowledges - There seemed to be several echelons of repair being performed. All required solid basic math logic, and electronic theory - however, for advanced digital equipment, algebra and logic became primary. Ability to read and not be overcome by the complexity of

335 - 2

schematic diagrams is essential. Most SMEs displayed a high degree of seriousness and thoroughness in their approach to the analysis and their jobs within the MOS. I observed in them the ability to deal with large, complex problem solving and the determination to pursue the task until complete.

MOS SUMMARY - 35K AVIONIC MECHANIC

Analysis Approach - Interviewing was conducted whenever the SME was available and for as long a time as he could spend with the analyst. Tasks were given to the course chief or the NCDIC and they would assign an expert when available. If no one was available, or had expertise on the equipment, we asked the Avionics people in TADS or DTD for help and they would send someone. Verification was done whenever a second knowledgeable person was available.

Problems - The greatest problem in 35K was a shortage of instructors. Sometimes there just wasn't anyone available for interviewing, let alone for verification. The course chief and division chief and TADS personnel were very cooperative, we just had to work around the shortage. It did cause some time loss.

Problems occurred in the area of rare, and new equipment. Some pieces of equipment are the responsibility of a 35K only when he has the additional skill identifier (ASI) training. It's hard to find these SMEs.

Discrepancies - Number of discrepancies were limited to a few errors in the TMs. There were some discrepancies in terminology - for example, the word "repair" used in task titles is misleading, as the 35K doesn't repair anything but the wiring, he is a component replacer. His main function is to troubleshoot a system, not really repair.

Soldier's Manual - The soldier's manual was helpful in some cases, but we did not use it much, except for references.

Equipment - We had use of mock-up equipment at the course for many of the tasks. This was extremely helpful and as close as we could come to the real thing. Some equipment is so touchy, so critical, that the 35K is generally not allowed to work on it until he has years of experience on the job with knowledgeable personnel. These tasks were identified as such in the comment section. Some tasks had to be analyzed by personnel in other MOS who, in reality, really performed the job.

Some equipment was so new that we performed the analysis only as it should have been done. We were unable to identify location as it hadn't been installed yet.

Personnel - Personnel were knowledgeable; it was evident they had been motivated to learn many related skills in order to perform their jobs. Many were pilots, or qualified to fly with the aircraft, which is an add-on skill. Older 35K's had had a more complete background in electronics and this made them more qualified to make educated choices when troubleshooting equipment. Younger SMEs had had to learn electronics on their own to be proficient in their job. This was especially true when reading schematics in order to track down faults.

35K - 2

SMEs were very courteous, helpful, and very patient.

Type of Knowledges - Knowledges concerning what "the thing" looks like and its function is important in order to locate it among all the other equipment on the aircraft. One needs to know how each piece of equipment fits into its system in relation to its wiring, in order to troubleshoot effectively. Terminology and technical vocabulary is important to know, in order to communicate with the pilot and other members of the maintenance team as well as in the use of the reference material and form completion. Certain electronics knowledges are necessary such as frequency settings for tuning radios and navigation equipment, and electrical principals involved in reading schematics and wiring diagrams, to troubleshoot. Use of TMs and other references require certain reading skills necessary to the 35K. They are important as there are just too many pieces of equipment to locate and operate to have them all in memory.

Instructional Review - Review was done per task by an instructor familiar with the course, and there were no problems in determining what was taught and not taught in the group-paced, lock-step course. However, the equipment is taught using mock-up, not real situations (the pieces of equipment and parts of the aircraft were real, but much of the equipment was removed and some things were not hooked up the "real" way or in the correct location). This is, of course, due to the nature of the MOS.

ETAP Manual - The procedures in the manual were used, but not necessarily the manual per se.

MOS Summary - 36C Wire Systems Installer/Operator

Analysis Approach - During pre-analysis planning, it was determined that interviews for 36C (Wire Systems Installer/Operator) would have to be held at various locations due to the fact that the course is divided up into sections because of the large number of tasks and variety of equipment used in the MOS. Going to the different sections to conduct interviews allowed SMEs to demonstrate task procedures for analysis. Tasks dealing with pole climbing and pole rescue operations, wire ties, and repair of field wire/cable lines were analyzed at the Pole Orchard. Those dealing with construction and troubleshooting of field cable lines and installation/operation of telephone sets and terminal boards were analyzed at the Tact Wire Unit. Tasks dealing with switchboard installation/operation were analyzed at the Switchboard Unit. Analysis of tasks involving installation of aerial field cable on poles and A-frames using reeling machines were analyzed at the Ponderosa, while those involving the use of telephone central office equipment installed in shelters were analyzed at section 10-A.

Interview sessions were generally held 3-5 days per week, utilizing one SME per session. During pre-analysis planning, simpler tasks such as pole climbing and making wire ties were identified to be analyzed first so as to serve as building blocks for longer and more complicated tasks to be analyzed later. Approximately two verifiers from each section were used to verify tasks for the 36C MOS all of whom were extremely cooperative and thorough.

The ETAP manual served as a good source of reference in conducting a task analysis. The definition of terms, the flowchart depicting the Extended Task Analysis Procedure, the explanation of ETAP features, along with the Taxonomy of Skills and Knowledges aided the analyst in ensuring that the project was implemented as prescribed.

Problems - The major problem encountered was instructor shortage which caused SME "burnout". As with the 67Y analysis, a shortage of instructors created pressure on the men which, when coupled with the demands of analysis, caused reluctance on the part of some SMEs to participate in the project. Again, as with 67Y, this caused some difficulty for the analyst to extract information: less information was volunteered, questions had to be more probing, and the interview setting became somewhat less relaxed. Despite instructor shortage, SMEs were very cooperative and helpful. Another problem with the 36C analysis was having two analysts interviewing within the same MOS. This was a problem because of instructor shortage.

Discrepancies - None, other than the expected differences in opinion among SMEs on insignificant items.

Soldier's Manual - The July 1980 edition of the Soldier's Manual was used. It served as an excellent guide in determining type of tools/equipment and major steps to include in each task analysis write-up.

Equipment - Some of the tasks dealing with the new telephone truck M-875 used by the 36C soldier were difficult to analyze due to nonavailability of SMEs who had had field experience with the equipment. The majority of the equipment used in the 36C MOS was available at the different course locations for task demonstrations by SMEs.

Personnel - SMEs were generally cooperative, courteous, and very knowledgeable. Although instructor shortage existed, SMEs were always provided for analysis and verification. Usually the SME verifier was able to do the instructor review thus avoiding time loss during analysis.

Types of Knowledges - The 36C soldier not only must be in good physical condition, but must possess good body coordination and motor skills for pole climbing and maneuvering equipment while on the pole. He/she also must be able to run along behind a moving vehicle to pay out and pick up cable. He/she must be able to read and comprehend written material as well as apply map reading and reference skills to locate and use information in TM's and job aids. He/she must possess good speaking and handwriting skills to communicate effectively orally and in written. Some basic math skills are required as the 36C soldier must be able to read and interpret gauges and calculate distances and measurements. He/she must be familiar with various safety precautions to avoid hazards and prevent injury to self and/or equipment.

MOS Summary - 36K Tactical Wire Operations/Specialist

Analysis Approach - During pre-analysis planning, it was determined that many of the tasks in the 36K MOS were the same as in the 36C MOS. For example, installation/operation of reeling unit RL-31E, installation/operation of switchboard SB-86, installation/operation of telephone set TA-312, and installation/recovery of field wire lines were tasks shared by the two MOS.

Interviews for the 36K MOS were held at various locations, as was done with the 36C MOS, due to the variety of equipment used. Interview sessions were held 3-5 days per week, utilizing one SME per session and one verifier per task.

Problems - Again, as with 36C, instructor shortage was the main problem. Whenever an SME was unavailable (which was rare), the analyst used the time to plan for the next interview by studying the equipment to be used in the next task analysis and by locating and skimming TM's applicable to that task to determine which questions to ask during the interview.

Discrepancies - None, other than differences in opinion among SMEs on insignificant matters.

Soldier's Manual - The July 1980 Soldier's Manual was used. It served as a good reference in determining major steps of task analysis write-up. In some instances, the equipment listed for task performance was incomplete.

Equipment - Despite instructor shortage, SMEs were always provided for analysis interview and verification. SMEs were very knowledgeable, courteous, and cooperative. They all had had field experience with the tasks.

Types of Knowledge - The 36K soldier must possess good reading and language communication skills to communicate with team members and to communicate in writing. He/she must possess good map reading and reference skills to locate, compare, and use information in TMs and job aids to select a course of action.

Basic math skills are also required of the 36K soldier. He/she must be able to estimate units of measure, compute time in Greenwich Mean Time, identify units of measure on instruments, compute and solve problems and interpret spatial relationships of figures, symbols and objects.

36K - 2

The 36K soldier must be in good physical condition to climb poles, lift and operate heavy equipment, and run along behind a moving vehicle while paying out cable.

The 36K soldier must use common knowledge to avoid hazards in order to prevent injury to self and equipment and apply preventive measures prior to task performance to minimize any potential safety or security problem.

MOS SUMMARY - 43E PARACHUTE RIGGER

Problems - The availability of trained personnel proved to be a major problem during the analysis.

Discrepancies - The Soldier's Manual did not include much essential information needed to complete task.

Soldier's Manual - As stated above, the Soldier's Manual did not include much essential information necessary for completing task. The manual often jumped from one step to another without instructing the soldier how to get there. The analyst noted that the Soldier's Manual relied heavily on technical manuals that were not always available to ten and twenty level soldiers.

Steps that proved to be identical to those listed in other task did not always follow the same format. The analyst noted that this was especially true with instructions on placing parachutes in their proper layout.

Photographs were often included in the manual for identifying certain parts of parachutes or for actions the soldier might need to take. The analyst found the photographs unclear and of poor quality in many cases.

Equipment - All equipment was available to the analyst during training (school) hours.

Personnel - The analyst worked with a large number of personnel during the analysis. Their knowledge ranged from superior to very poor. The analyst asked that one SME be excused from the project.

Team members often displayed disagreements as to how a task or step was to be performed with each other. Official manuals were often said to be incorrect by the subject matter experts.

Additional job duties often made the more knowledgeable personnel unavailable.

Knowledges - Knowledges involving directions appeared to be VERY ESSENTIAL FOR WORKING WITH PARACHUTES. It appeared very important that a soldier recognize what directions a parachute gore or clevis be moved.

The ability to identify certain parts of parachutes according to numerals appeared to be very important. For example, recognizing the meaning of gore 16.

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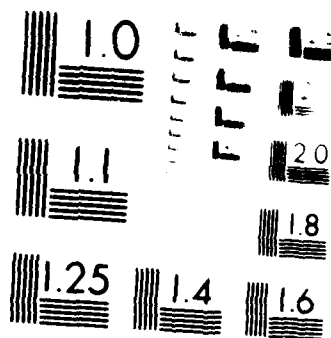
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT68-81-C-0017

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MOS SUMMARY - 43M FABRIC REPAIR SPECIALIST

Analysis Approach - Interviews for 43M (Fabric Repair Specialist) were generally conducted at the fabric repair classroom sites where light-, medium-, and heavy-duty sewing machines were located. Since virtually every task within this MOS involved operating and maintaining this machinery, the SMEs were inclined to demonstrate how this equipment was used in typical field operations. These demonstrations facilitated the interviewing process and subsequent write-up of ETAPs, because the procedures were often complex and difficult for the SME to verbalize.

Two SMEs were assigned to this MOS analysis, but one in particular served as principal informant approximately 85 percent of the time. A task list was provided and closely followed throughout the analyses. In most cases, each task was written in final form during the interview; tasks requiring editing were completed the following morning in the field analyst's office. Typically a one- to two-hour block of time was reserved each morning for editing ETAPs and scheduling interviews.

Prior to analyzing a higher skill level of tasks, the completed ETAPs were submitted in batch to a small review committee for verification. The reviewers were both former 43M instructors who interacted with each other and the principal SME during verification.

Problems - A consistent problem that was encountered involved having access to the classroom buildings. Due to prearranged meetings among the instructional cadre, battalion inspections, and periodic unavailability of keys to the buildings, the analyst - SME interview had to be rescheduled on several occasions.

Discrepancies - Although there were relatively few and minor discrepancies, they usually involved a lack of agreement between the way in which procedures were written in the current FM and the SME's account of how such procedures were to be followed. More specifically, certain procedures in the FM often required additional steps and, in some cases, further elaboration on descriptions of machine maintenance.

Soldier's Manual - A xeroxed copy of a 1979 edition of a Soldier's Manual was made available to the analyst prior to analysis of 43M. Because it was only a xeroxed copy, the photographs displayed throughout the manual were lacking in detail. There was sufficient clarity of detail among simple illustrations and diagrams.

Equipment - The 10-level soldier was trained to operate and maintain a light-duty sewing machine and was expected to be facile with sewing accessories, such as scissors, cutting blades, small pliers, chalk, lubricating oil, and brushes for cleaning the sewing machine. The 20-level soldier was responsible for operating and maintaining medium- and heavy-duty sewing machines.

43M - 2

For mobile unit operations, the 10-level soldier was expected to set up and operate a 3-kilowatt generator set, and various tables designed to support the sewing machines.

Personnel - As stated earlier, two SMEs were available for interviewing: one principal and one auxiliary. The principal SME was extremely cooperative and patient. The auxiliary SME was less available due to his increased involvement in developing skill qualification tests for 43M. The SME involved in the ETAP review was very thorough and helpful in suggesting ways to revise certain statements. The instructor had several years of teaching and field experience, and was extremely thorough in his review.

Types of Knowledges - Overall, six skill areas were consistently identified in the tasks comprising 43M. They involved: recognizing various shapes of tears in fabrics; discriminating among various simple geometric shapes (for patching materials); marking off whole numbers and fractions on a standard 12-inch ruler; estimating fractional distances; applying motor skills (e.g., regulating a foot treadle and manipulating fabric under a sewing machine); and completing various forms.

Very few tasks required a soldier to reference and read information in documents outside the manual.

MOS SUMMARY - 44B METAL WORKER

Pre-Analysis - Blair Bryant, POC at Aberdeen, set up and presented a one-hour briefing on the goals of the BSEP Analysis Contract, the personnel requirement, procedures for completing the analysis, verification and Instructor Review. The briefing was given to officers and key enlisted personnel responsible for administering the 7 MOS being analyzed. The briefing was given the week of 7 June 1981.

An additional briefing was given by the analyst to each SME and to key 44B course NCO's concerning analysis procedures plus a general overview of project.

Analysis - Interviews were held with a different SME for each metalworker task. The interviews were conducted on job site with SME physically performing the task first and then verbally outlining how the task was performed. Interviews were conducted five mornings a week from 7:30-10:30, followed each day by a verification interview with a section NCO. Instructor Reviews were usually done on Fridays with a section Chief NCO.

The format followed was taken from an original ETAP manual with original forms. TPA-1 was completed with SME to get major Step breakdown, data on how task was performed was placed on TPA-2, Knowledge Analyses were completed on original TPA-3, which meant writing volumes over and over.

Problems - One major problem incurred was trying to get SMEs who had performed the various welding and metal working tasks in the field. Some SMEs had to be rejected and a qualified one found. The Chief Instructor was always cooperative and helpful with this problem.

Using a different SME each day required an initial orientation period to tell about program, find out something about SME and let him get used to analyst.

Many of the SMEs had difficulty with the oral interview format, thus we quickly changed to the performance/oral interview style. The SME could talk if they had the equipment in their hands.

It was a constant battle to keep analysis on what was done in the field rather than how it was instructed at the school.

Discrepancies - Discrepancies existed between procedures cited by school and SM and those as performed in a field environment. Discrepancies noted in Comments Section, TPA-1.

Soldier's Manual - SM dated January 1981 used to obtain task number and task title. The task contained in SM did outline major points to be covered fairly well. Some disagreement by the SMEs as to whether task should be included in SM or not, based on their field experience.

SM divided into Duty Position tasks Skill Level 1-2 in Chapter 2 and Related Technical Tasks, Skill Level 1 and 2 in Chapter 3. The factors of their being Resident or Non-Resident and Critical or Non-Critical tasks was a source of confusion as to whether or not it was to be analyzed. The school position at start was that every task in SM was to be analyzed. This was later revised, and some tasks were excluded.

Personnel - SMEs were provided on a timely basis by Senior Instructor, even if all of them did not meet the required criteria of field exposure or possess the oral skills required of analysis.

The key instructor personnel were most cooperative and helpful and believed the analysis would be of direct benefit to them at a later date in their Army careers.

Course used "self-paced" which meant instructors were constantly busy and served as a resource person.

Types of Knowledges Needed - MOS requires ability to read charts and TMs used in performing tasks.

Metal worker must possess good eye-hand coordination to be a successful welder. Normal color vision is required to recognize colors in flames and in determining heat in each flame.

Soldier must be able to assemble, disassemble and maintain welding torches, paint sprayers and perform body repair procedures, and must possess basic measuring skills.

MOS SUMMARY - 44E MACHINIST

Pre-Analysis - Briefing for all section NCO's, Instructors and Course Director was conducted by POC and RCA Analyst on 14 September 1981. The briefing included goals of MOS Basic Skills Contract and the procedures by which the analysis would be carried out.

A pre-analysis session was conducted with a Senior Instructor on Quality and Quantity of SME's needed, the reference materials required, a time schedule and a location to start analysis process. A key decision made was that we would use only one or two SME's for each of the sections of the course: Bench operations, Lathe operations, Versa-mil operations, and Bandsaw operations.

Analysis - Interviews were held on specific job site for that task with the SME performing the tasks and orally telling what was required in performing the task. Interviews were conducted each morning from about 0730-1030 hours. Verification interviews on previous analysis followed with section Senior Instructor. Instructor Reviews were conducted on Fridays with Section Senior Instructor.

Problems - One major problem was that SMEs had trouble talking about how band saws and mills were used in field, because band saws were not in field use and mills were in field use only in a few selected places. The decision to analyze these two machines was made by operating POC.

Some of the SMEs had difficulty with the depth of interview process and felt it was enough to say what was done to complete task and not the "nitty gritty" details of how.

Student "surge" in classroom space required moving analysis site several times which bothered the course people more than the analyst.

Discrepancies - Discrepancy existed between procedure cited by school and how it is actually performed in a field environment. Such discrepancies were cited in Comment Section on TPA-1.

Soldier's Manual - SM dated January 1981 was used to obtain task number and task title.

SM contains many 20-level tasks for performing milling operations and band saw operations. SMEs state they never saw this type band saw in field, and milling machines only in a few selected sites.

The Soldier's Manual is divided in Chapter 2 with Duty Position Tasks, Skill Level 1/2 and Chapter 3, Related Tasks, Skill Level 1/2. The critical/non-critical, resident/non-resident factors tended to further confuse issue of which task should be taught/analyzed or not by SME Instructors.

44E - 2

Personnel - SMEs were provided as necessary to complete analyses. Overall, they were of excellent quality and most were cooperative and helpful. The Course Director and Senior NCOs were very supportive of the process.

Course "surge" created additional pressure on instructors and they were not as relaxed in the analysis process as when there was less student personnel participating in the course. The course was "self-paced" which meant Instructors (SMEs) were constantly being involved as resource persons.

Types of Knowledge Needed - Reading, Comprehension and reference skills are needed to read TMs and the maintenance manuals.

Basic Math Skills are required for reading and interpreting complex gauges, calculating measurements to .0000 and manipulating numbers.

An understanding of manipulating basic Trig formulas to work with degrees and angles is necessary. A full blown mastery of Trigonometry is not essential.

Comprehension of technical terms is essential.

MOS SUMMARY - 45B SMALL ARMS REPAIRER

Pre-Analysis - A one-hour briefing for all section NCOs, Instructors and the Course Director was conducted by POC and RCA Analyst during the week of 11 December 1981. The briefing included goals of MOS Basic Skills Contract, and the procedures by which analysis would be performed. A question and answer session followed the formal briefing.

A pre-analysis session was conducted with the Senior Instructor to work out the specifics of the Analysis Process. This included such things as quality and quantity of SMEs, a logical order of progress through MOS tasks, site for analysis to take place, and a discussion of reference materials used and needed.

A decision was made to do the analysis in rooms holding the small arms equipment that SME worked in. A schedule was established, taking into account that we would progress from the simple to complex weapons and from the easily learned to those tasks that the 10-level soldier had trouble learning.

Analysis - Interviews and analysis were conducted in rooms in which the equipment and SME were located. SMEs were designated by the Senior Instructor. Interviews were conducted daily from 0730-1030 hours. Basic ETAP Procedures were followed. Verification interviews and Instructor Reviews were scheduled and conducted with Senior Instructor on an as needed basis.

Problems - One of the major problems incurred was to keep analysis at what 10-level soldier did in a DS, GS repair unit, and to sort out what operator and organizational level maintenance personnel did in the task.

The Christmas holiday period from 18 December to 4 January proved to be a difficult one to find SMEs who were not on leave or performing needed repairer and update work in the 45B course. In addition, the entire tile floor was taken up and replaced during this holiday period.

Student "surge" periods put additional pressure on SME Instructors which required more adept handling by analyst to relax SMEs in the interview process.

Discrepancies - The M219 machine gun was not analyzed as it had been replaced in field by M240 except in NG units. It has been dropped from instructional schedule at Aberdeen.

It appears to be a difficult task to keep the TMs up to date with the constantly changing inspection criteria coming forth.

458 - 2

Soldier's Manual - SM dated January 1981 used to obtain task numbers and the task title. Major steps contained were usually complete and accurate.

The 9 tasks for the M219 machine gun should be removed from SM as weapon has basically been removed from field use.

Soldier's Manual is divided into Chapter 2, Duty Position Tasks, Skill levels 1/2 and Chapter 3, Related Tasks, Skill levels 1/2. The critical/non-critical, resident/non-resident factors tend to further confuse issue of whether task require analysis or not.

Personnel - The quality of SMEs was excellent with quality and attitude of Senior Instructor who performed pre-analysis, verification, and instructor review as very superior.

Course "surge" and Christmas holiday period caused some "scurrying around" but no unsurmountable obstacles.

Types of Knowledges Needed - Reading and comprehension and reference skills are essential for soldier to follow the TM reading and to interpret assembly/disassembly illustrations.

Must read gauges and calculate measurements with accuracy. If not accurate, could cause weapon to explode.

Must be adept at disassembly/assembly of weapons with many, intricate parts.

Must learn technical nomenclature of weapon parts.

MOS SUMMARY - 45K TANK TURRET REPAIRER

The soldier in 45K is basically a mechanic. He is responsible for fixing or replacing anything that goes wrong on a tank turret. Most tasks involve a wrench and tools, although some tasks such as troubleshooting a particular system require some mental thought and understanding. The procedures involved in repairing a turret are covered in great detail in the technical manuals. Some referencing skills are required to locate the proper TM's and to reference through them. The only other skills necessary other than tool use and following directions are some measuring skills. Components must often be measured and these measures compared with tolerances in a table. Troubleshooting requires logic, following charts, making decisions, an understanding of the system, and common sense.

In general, to be a 45K requires basic mechanical skills, and some strength (some components are heavy). Tool use and following directions are the largest assets a 45K could have.

MOS SUMMARY - 52C UTILITIES EQUIPMENT REPAIRER

Analysis Approach - Pre-analysis of the MOS consisted of briefings, grouping tasks, and developing a schedule to facilitate implementation of the program. Briefings were held with the Branch chiefs and several members of the school to familiarize them with the goals of the program, the procedures used at interviews and the requirements necessary for the successful completion of the project. An SME was provided by the school to arrange tasks according to complexity and equipment so that those tasks first analyzed would be used as building blocks for later tasks. A tentative schedule was also created to provide SMEs time to prepare for the interview.

Interviews were held within the training area, thus enabling easy access to personnel and equipment. Interviews generally took place 4-5 days per week, utilizing one SME per session. Approximately 10 SMEs were required to complete the MOS.

The format used for the interview was basically that established by the ETAP Manual. The first SME provided a detailed description of how the task was performed in the field. The second SME validated the information provided by the first SME and fulfilled the role of instructor by identifying skills and knowledges taught at the school.

Problems - The MOS was being reorganized when analysis took place. Many of the tasks previously contained in the MOS were being assigned to other MOS and new tasks were being added. Given these changes, general confusion existed as to which tasks and performance measures should be analyzed for each task. On several occasions tasks were changed and consultations had to be held.

Coupled with a reorganization of the MOS was a change in branch chiefs. Different individuals at different times were assigned responsibility for briefing and assigning SMEs. As a result there was little coordination between personnel within the MOS. SMEs often arrived late and sometimes totally unprepared. Meetings were held with the branch chiefs to rectify this problem and there were some positive results near the end of the MOS.

Other problems encountered resulted from the interview format itself. Some SMEs found it difficult giving a step-by-step detailed description of procedures. When forced to describe those procedures which they felt were explained by common sense, some SMEs became frustrated and angry.

Discrepancies - Some discrepancies existed between procedures cited by the school and Soldier's Manual and those used in the field. Several tasks called for repairing faulty components which would normally be replaced. Such discrepancies were cited in the Comments Section of the ETAP.

52C - 2

Soldier's Manual - The Soldier's Manual provided the basic performance measures for 10 level tasks, except for those tasks pertaining to the Bottle Cleaning and Charging Station. Tasks and task performance measures for the Bottle Cleaning and Charging Station as well as for all 20 level tasks were supplied by the school. As stated above, clarification of tasks and task performance measures had to be sought on several occasions.

Training - The 10 level soldier is taught how to operate and maintain utility equipment and by the 52C soldier. He is also taught how to fill out forms, use the TM, and read schematic diagrams. The 20 level repair person is taught how to repair and troubleshoot equipment. Instruction for 52C soldier consists of video tape recorders, platform instruction or demonstration and classroom instruction. Seldom is the soldier given hands-on instruction.

Personnel - The majority of SMEs were cooperative. The amount of enthusiasm and cooperation exhibited by each SME seemed to be related to whether or not he adjusted to the interview format. The branch chiefs were also very cooperative. Most of the problems cited seemed to stem from lack of communication and coordination between the branch chiefs and SMEs assigned for analysis within the school.

Types of Knowledges - The 52C soldier must constantly use a TM to perform tasks. Many of the tasks involve operating and maintaining equipment, disassembling, assembling and replacing components and the reading of test equipment gauges and schematic diagrams. Thus, the necessary skills required of a 52C soldier include recognition, referencing basic mathematics, following procedural directions, and interpreting illustrations and schematics.

MOS SUMMARY - 52D POWER GENERATION EQUIPMENT REPAIRER

Analysis Approach - Pre-analysis of the MOS consisted of briefings, grouping tasks, and developing a schedule to facilitate implementation of the program. Briefings were held with the Branch Chiefs and several members of the school to familiarize them with the goals of the program, the procedures used at interview, and the requirements necessary for the successful completion of the project. An SME was provided by the school to arrange tasks according to complexity of generator systems so that those tasks first analyzed would be used as building blocks for later tasks. A tentative schedule was also created to provide SMEs time to prepare for the interview.

Interviews were held within the training area enabling easy access to personnel and equipment. Interviews generally took place 4-5 days per week, utilizing one SME per session. Approximately 30 SMEs were required to complete the MOS.

The format used for the interview was basically that established by the ETAP Manual. The first SME provided a detailed description of how the task was performed in the field. The second SME validated the information provided by the first SME and fulfilled the role of instructor by identifying skills and knowledges taught at the school.

Problems - One of the major problems encountered was the inability of the Engineer School to provide SMEs who had field experience. On several occasions an SME had to be dismissed after admitting that he had never performed the task in the field. The causes for this problem were twofold: poor screening on the part of the School Training Brigade and lack of qualified personnel. To rectify this problem, several meetings were held with the Branch Chief. Another major problem involved SMEs coming unprepared to the interview. Some SMEs spent the initial part of the interview sifting through the Technical Manuals trying to locate procedures for performing the task. Other SMEs came to the interview not knowing what tasks they had been assigned. Several meetings were held with the Branch Chief to discuss this problem. It was suggested on several occasions that a briefing be given to all SMEs, but this was rejected because of the School's manpower needs. Finally, a checklist was created to be given to each SME prior to coming to the interview. The checklist contained a brief introduction explaining the purpose and importance of the program and their role in it. The checklist also contained questions geared toward insuring that the SME would be prepared for the interview. The checklist improved the preparation of SMEs for task analysis.

Other problems encountered resulted from the interview format itself. Some SMEs found it difficult giving a step-by-step detailed description of how a task was performed. When forced to describe procedures they felt were common knowledge, several SMEs became frustrated and even angry.

Since all of the SMEs were instructors, it is felt that the information they provided was greatly influenced by what is taught at the School. The analyst had to constantly probe the SME to determine if the procedure given was that which was performed in the field. During validation,

The analyst had to insure that the SME was not simply "rubber stamping" his predecessor's work. This was accomplished by asking general and specific questions concerning the procedures listed.

Discrepancies - Basic discrepancies existed between procedures cited in the Soldier's Manual and those used in the field. Several tasks called for the repairing of faulty components which would normally be replaced in the field. Discrepancies also existed between test equipment cited in the Soldier's Manual and test equipment used in the field. According to several SMEs, test equipment cited in the Soldier's Manual would not be used in the field either because the equipment normally would not be available or because the test procedure would be too time consuming. Such discrepancies were cited in the Comments Section of the ETAP when they occurred.

Soldier's Manual - The Soldier's Manual provided the basic performance measures for each task, except for the discrepancies cited above; it provided a good guide for determining what each task actually entailed.

Training - The 10-level soldier is taught how to operate and maintain generators, remove, disassemble, assemble and replace various components. He is also taught how to fill out forms, use the TM, test equipment, and read schematic diagrams. The 20-level soldier is taught the same repair skills as the 10-level soldier, however, emphasis is placed on isolating faults and using test equipment. Instruction consisted of self-paced programs, video tape records, platform instruction of demonstration and classroom instruction.

Types of knowledges - The 52D soldier must constantly use a TM to perform tasks. Many of the tasks involve operating and maintaining equipment, disassembling, assembling and replacing components and the reading of test equipment gauges and schematic diagrams. Thus, the necessary skills required of a 52D soldier include, recognition, referencing basic mathematics, following procedural directions, and interpreting illustrations and schematics.

MOS Summary - 54E Chemical Operations Specialist

Analysis Approach - The majority of the SMEs were instructors because of the requirements of the MOS. Forty-six SMEs participated in the analysis due to the complexity of the MOS and the organization of the Chemical School into different divisions, e.g., Radiological, Chemical/Biological, Management Logistics, Military Arts.

Problems - Constant relocation of RCA personnel office space during the first half of the analysis (six times) caused significant loss of time on the part of some SMEs in spite of the large number of SMEs who participated in the analysis.

Initially, a somewhat negative attitude toward the project was projected by the school; however, this changed for the better during analysis as the school perceived the benefits possible from this in-depth, detailed analysis.

Discrepancies - Inclusion of a number of tasks that should properly be two tasks because of the inclusion of two areas: Chemical/Biological and Radiological. Each of these, in many cases, constitute an entire task.

Inclusion of two tasks on the 100 GPM pump, when, in fact, there are no 100 GPM pumps at Ft. McClellan. (See equipment section).

Soldier's Manual - The 54E SM skill level 1/2 was somewhat deficient in information. Many SMEs found fault with existing task titles and performance measures, as well as significant gaps in information and inadequately-expressed steps in the manual.

Equipment - As noted in the discrepancies, there are no 100 GPM pumps at McClellan, even though there are two tasks in the POI. Analysis was done on the 65 GPM (sometimes called 60 GPM), which is what is actually taught.

Personnel - For the most part, personnel were cooperative. A number of SMEs made a special effort to provide assistance, working around a very busy schedule.

Types of Knowledges - Heavy emphasis on reference and procedural skills and in Skill Level 1, basic mathematics. MOS covers a wide range of highly technical material since it covers chemical, biological, and nuclear tasks, resulting in the soldier specializing in a particular area.

MOS SUMMARY - 55B AMMUNITION SPECIALIST

Analysis Approach - Interviews for the 55B were held in the office. They were followed up in the training areas in many cases, to clarify the tasks. This was extremely helpful in providing for a visual understanding of the verbal presentation. The tasks were approached by identifying those that were part of the other tasks and doing those first. The operation of training Ammunition Supply Point (ASP) included most of the basis of the MOS.

Problems - There was one major problem involved in the analysis which concerned the priority duties that the SME often was faced with. Despite this demand on the SME's time, very little lost time resulted.

Soldier's Manual - The Soldier's Manual was well written with one exception: the referencing of various publications was poorly done. It is doubtful a soldier using the manual would have had much success in referencing the various parts of the task to the specific publications (TM's, FM's, etc.).

Discrepancies - None of significant value was found.

Equipment - The 10/20 level soldier is taught the use of common hand tools and use of available dunnage for bracing of ammunition in various loading configurations. The major equipment taught is use of the conveyor and operation of the forklift.

Personnel - There were two (2) primary SMEs used for most of the tasks. One was well versed in operations of a field ASP and the other more experienced in higher echelon facilities. They complemented one another nicely. Cooperation and interest in the project was very high for both SMEs.

Types of Knowledges - The primary skills present were perceptual, in recognition and precautions. Basic math skills for addition, subtraction, and multiplication of various amounts are required. Basic reading and reference skills are necessary to determine storage and loading requirements.

MOS SUMMARY - 55D EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST

Analysis Approach - All interviews were done in the office setting. Due to the sensitive nature of the material no observation was allowed of equipment or performance of the tasks.

Problems - The major obstruction to performing this analysis was the sensitive nature of the material being analyzed. The major reference source was TM 60 Series, to which access was denied due to the Navy being the proponent of the series and its "For Official Use Only" classification. This limitation extended in many cases to what could be communicated by the SMEs, as it was felt that to discuss it was to utilize information included in the TM 60 Series. After much discussion it was decided to utilize a technique that still would provide the type of knowledge necessary without detailing specifics of tasks that could possibly be interpreted as infringing on the sensitivity of the material. Another problem was the demands on the SME's time. Although no major loss of time was experienced much ingenuity had to be exercised in accomplishing the analysis.

Discrepancies - No major discrepancies were experienced, only minor disagreements on the method of performing the task between various SMEs.

Soldier's Manual - The usefulness of the soldier's manual was difficult to determine as most of the referencing was to the TM 60 Series. That which was not, provided a well-thought out guide for determining the steps of the tasks.

Personnel - SMEs were extremely cooperative after the purpose of the analysis was understood. The demands on their time were critical in how much time they could allocate to the project. Despite a heavy demand on their time, various methods of utilizing all available personnel of the 55D grouping in the area kept the project active and productive.

Equipment - The 10/20 level soldier utilizes a variety of common hand tools, engineer tools and specialized EOD tools. The equipment is demonstrated and utilized both at Redstone Arsenal and at Indian Head, Maryland.

Types of Knowledges - Reading, comprehension and reference skills are the most important knowledges the 55D has to possess, since he must locate various items of ordnance in various reference publications utilizing information gained in comparison of known and unknown material. The ability to retain a great deal of information and accurately recall it when needed is essential. Math skills range from basic to instant recognition of various planes and angles. The reading of schematics to determine the internal workings of various pieces of ordnance is essential in determining safe procedures.

MOS SUMMARY - 57E LAUNDRY AND BATH SPECIALIST

Analysis Approach - Interviews for the 57E (Laundry and Bath Specialist) were held in the classroom. Interview sessions were held 5 days per week for 6-7 hours per day. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. One primary SME and two verifiers were needed to analyze the MOS. The verification process consisted of the initial SME, the verifier, an instructor, and the analyst reviewing the tasks for accuracy and clarification. During the instructor review, the instructor reviewed the tasks with the analyst to determine what steps were not taught and to review the knowledges.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. However, there was a tendency for SME's to go "strictly by the manual", i.e. steps in the Soldier's Manual. In some instances different major steps were identified as part of the analysis. In these cases the SME's noted that they were further breakdowns of steps listed in the Soldier's Manual.

Soldier's Manual - The January 1980 version was used. It provided a comprehensive guide to task performance. In many instances it duplicates material contained in technical manuals. SME's generally thought this was a defensible procedure.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Most equipment items have been standard in the inventory for many years and have well established operating and maintenance procedures.

Types of Knowledges - In general, spatial orientation and environmental observation skills predominated. The 57E is required to use technical manuals and must complete forms. Most forms require attention to detail and counting skills. Writing skills required are minimal. Denominate numbers are used.

MOS SUMMARY - 57H TERMINAL OPERATIONS COORDINATOR

Analysis Approach - The analyst conducted interviews at different site locations at Ft. Eustis, Transportation School Headquarters, Rigging Loft classrooms, and RCA field office.

Interview sessions were held two days per week, leaving the remaining days for write-up. The task list was divided by subject and topical areas which required several or more SMEs to participate.

Two verification committees were involved to complete the analysis effort. The committees consisted of DTD personnel to review technical accuracy and a BSEP civilian committee to review the ETAP format, level of detail, and specificity.

Problems - The major problem encountered was with the level of detail, specificity and ETAP format. Although the DTD verification for technical accuracy found little error in the analysis, the BSEP committee would not accept 78 tasks. To remedy the situation, the Site Supervisor met with the BSEP Committee and DTD Committee members to identify the weak areas of analysis and to seek further detail. 78 tasks were re-analyzed by the Site Supervisor with SMEs and resubmitted for both committee approval. This effort involved an additional three weeks of analysis. All 78 tasks were accepted by committee with minor changes to be made.

Discrepancies - None.

Soldier's Manual - A current task list and Field Manual 55-57H Skill Level 10 and 20, June, 1981, were used.

Equipment - The 10/20 level is taught the use of basic hand tools, major equipment involved in the MOS is taught hands-on with close supervision. Many of the tasks require more than two personnel assistants.

Personnel - SMEs were readily available for all various subject areas on the task list.

Types of Knowledges - Reading, comprehension, reference skills, and basic mathematics (addition, subtraction, multiplication and division) are necessary for this particular MOS. Although much of the task performances are physical activities, the soldier must also compute tonnages, and solve math problems for marine terminal operations.

MOS SUMMARY - 61B WATERCRAFT OPERATOR

Analysis Approach - Interviews for 61B were conducted at Ft. Eustis in the RCA Field Office, 61B classroom/instructional area, and the Officer's Club (during hot/humid weather conditions). In addition, some tasks with certain vessels required analysis interviews at Ft. Story for approximately 2 weeks. Interview sessions were generally held 4-5 days per week.

The task list was grouped only in areas which required following a systematic area of performance for certain subject areas, but generally it was followed in order by which it was presented.

One verifier was provided to review technical content.

In most cases, verification and instructor review were conducted at the same time with both SMEs.

Problems - Any problem areas are identified under "Discrepancies", "Personnel", and "Equipment".

Discrepancies - The analyst identified discrepancies that the SME commented on concerning what the Draft Soldier's Manual listed for task performance, versus actual field experience. In many cases, the 10-level will perform minimal task performances and are not responsible for particular requirements inducted in the Draft Soldier's Manual.

Soldier's Manual - A draft Soldier's Manual was provided by the POC which was beneficial as guidance for task analysis, however, many steps in the draft were not in order and did not reflect real current requirements by the soldier.

Personnel - One SME for initial analysis was provided, when this SME was not available occasionally, the back-up SME would fail to show up for the interview. This hindered the analysis effort on periodic occasions.

Types of Knowledges - Reading, comprehension and reference skills are necessary for certain task performances, but a majority of the tasks are purely physical activities.

MOS SUMMARY - 61C WATERCRAFT ENGINEER

Analysis Approach - The initial problem faced in developing an analysis approach to 61C was that of identifying the number and nature of the tasks to be analyzed. As the most recent 61C soldier's manual was current in 1977, the analysis was to be based on a task list provided by the Transportation School.

The first list provided consisted of 523 task statements. Several dozen entries were identified as "common tasks", generic-type activities presumed on any vessel (e.g., "Start/Stop High Speed Heavy-Duty Diesel Engine"; "Stand Throttle Watch"). The remainder of the list was divided into a series of "vessel-specific" lists identifying tasks to be performed on particular watercraft (e.g., "Clean Oil Cooler Element/LCM-8"). Both common and vessel-specific lists were further divided into Skill Level 1 (C10) and Skill Level 2 (C20) task groups.

The first few weeks of work on 61C were devoted to analyzing the task list. Many discrepancies affecting the accuracy of the task count were easily apparent: particular task statements/numbers appearing repeatedly within and across the sub-lists comprising the master document; identical task statements appearing under two or more different identifying numbers within and across lists, numerous task statements presented without identifying numbers; whole pages of statements that appeared to be duplications or paraphrases of statements listed elsewhere.

After the analyst reviewed the master list with a 61C SME from the Instructor Branch, many additional problems became apparent, chiefly arising from the nature of some of the task statements. A common task titled "Maintain Vessel Engineering Equipment", for example, was considered by the SME as too broad in scope to be meaningful; without clarification from the T-School limiting the focus of analysis to particular pieces of equipment as installed on particular vessels, an analysis of the task appeared to be impossible. Similar difficulties were encountered with a number of the common tasks; the generic nature of many of the task statements seemed to be in direct conflict with the specific nature of the required ETAP format.

An annotated draft of the master list, including all duplications and discrepancies noted as well as numerous requests for clarification of individual task statements, was submitted to the POC's office. It was also suggested to the T-School that the list, as presented, appeared to be a working draft rather than a final product accurately reflecting the training needs of the MOS, and was therefore not an appropriate basis for analysis.

The analyst was advised that no significant revision of the list would be forthcoming, and that the analysis effort would have to proceed based on the list essentially as given. Requests for clarification of particular task statements were to be resubmitted to the POC as needed for work in progress. The T-School established a priority sequence for the analysis, indicating that the common tasks were to be considered first, followed by vessel-specifics for the LCU-, the LCM-8, the tug-boats, the amphibious vessels, and all remaining watercraft.

The issue of the task list was, however, to be re-opened some five months later, when independent inquiry by the analyst revealed that the master list had, in fact, been a working draft

intended to encompass the broadest possible range of activities for a marine engineman on any Army vessel. Many task statements had been rephrased, combined with one another, or completely eliminated; the total number of statements listed had been reduced roughly by half, to approximately two hundred and fifty. DTD personnel had restructured the list into a matrix format, with task statements grouped numerically by vessel system (electrical, hydraulic, engine, etc.), and flagged for application to particular vessels by means of a check mark in the matrix block at the point of intersection between task title and vessel name.

The analyst informed the POC's office of the existence of the revised list, and in the meetings that followed, the list was formally presented for consideration. Given the limited time remaining for analysis, it was decided that work on the LCU-presumed to be complete before the arrival of the revised task list should be reopened to include the thirty seven new tasks listed on the new matrix. The analysis was to be based on daily interview sessions with an SME experienced in engine-servicing on the LCU, with the Army's own task analysis results (graciously provided by DTD personnel in the form of their 550 task analysis summaries) being utilized as a framework for defining the basic parameters of the task activities.

At the end of the time period allotted for analysis, all seventy LCU tasks (as per the revised matrix list) had been analyzed; another dozen tasks analyzed prior to the arrival of the new list were also submitted to the School for consideration.

Personnel - Four different SMEs were utilized for the analysis of 61C. Interviews took place variously in the RCA field office, in the offices of the 61C Instructor Branch, in maintenance shops and on-board vessels docked in Third Port.

The analysis effort was severely hampered by the limited availability of SME time. The analyst was informed by DOTD instructors that, given the fact that 61C-10/20 classes were in progress at the time, and given the shortage of advanced 61C personnel Army-wide, SME time would be on a catch-as-catch-can basis. Regular scheduling of interview sessions proved to be impossible: meetings between analyst and SMEs were repeatedly cancelled - often without notice - due to conflicting demands on SME time. While the POC's office continued to express confidence in their ability to support the analysis effort, it gradually became apparent that the analysis of 61C would be characterized by weeks of frenzied activity followed by weeks of "dead time" when no SME was available, forcing the analyst to work on portions of other MOS undergoing analysis by other RCA field staff.

The fourth SME assigned to the project is to be particularly commended for her contribution to the process. Faced with the prospect of interviewing more than thirty tasks in less than two weeks time, the SME agreed to participate in marathon interview sessions of six to eight hours duration daily. Her cooperative spirit, energy, and initiative throughout the period were truly admirable, and her unflagging concern for accuracy of detail suggested a dedicated professionalism worthy of special recognition. Her supervisors are also to be commended, both for restructuring her work-load to permit the interviews to proceed without interference, and for their willingness to

offer the analyst and SME the benefit of their own knowledge and expertise in resolving questions that arose regarding specific task activities and procedures.

It should be noted that DOTD (Instructor Branch) personnel for 61C must cope with exceptionally difficult circumstances in creating a program of instruction to meet the training needs of the MIS. It appears that 61C is unique among the many MOS trained at the T-School. Aviation MOS, for example, are indeed trained as "occupational specialties"; helicopter repair is divided into 67N (Huey), 67T (Blackhawk), 67Y (Cobra), and so on. The marine engine man, however, may eventually be assigned to any one of a dozen different types of watercraft in Army inventory, and the time allotted for C10/20 schooling is simply not sufficient to allow training of "vessel-specific" procedures for all vessels. The best that instructors can hope for is to teach their students sufficient general theory and fundamental principles of engineering equipment operation/service/replacement/repair to permit later transfer of generic skills and knowledges to specific vessel applications, when given the pertinent TMs and specific on-the-job-training. The Instructor Review phase of the 61C analysis revealed a majority of the tasks analyzed to be classified as "Not Taught" in the C10/20 programs: this is not surprising, since most of the task titles pertain to specific procedures for particular pieces of equipment as installed on a particular vessel. Limitations of classroom time and limited availability of training aids require that all such tasks be taught on an OJT basis.

Additional challenges faced by instructional staff apparently arise from administrative divisiveness within the marine field. Personnel from DTD are tasked with creating the task list which forms the basis of the Soldier's Manual, presumably a reference point for design of the C10/20 POI. Task descriptions are generated through the use of Army manuals and field procedure. DOES, however, is responsible for licensing the students upon completion of their formal training: DOES personnel work from Navy manuals and references, and often arrive at task descriptions that bear little resemblance to the DTD product. Further, DOTD instructors are currently denied access to the DOES licensing examinations, and are given virtually no guidance regarding the particular skills and knowledges that students must possess in order to attain marine licensing in accordance with the expectations of the DOES branch. The result of this awkward situation is that a student who successfully completes his 61C-10 or -20 training program may find that he is unable to pass his licensing exam without extensive additional study.

In sum, it appears that the difficulties faced by the RCA analyst over the course of work on 61C are a direct reflection of the overall status of the MOS: manpower shortages, confusion over task count, conflicting definitions of task statements and procedures, discrepancies between the actual content of the POI and various administrative perspectives on what the POI should include ... it is hoped that when the time comes for Army training command to give meaningful consideration to the status of 61C, many of these problematic elements can be eliminated, and the training process restructured to allow the 61C student a simpler path of access to the skills and knowledges necessary for successful job performance.

MOS SUMMARY - 62B CONSTRUCTION EQUIPMENT REPAIRER

Analysis Approach - Interviews for 62B (Construction Equipment Repairer) were held at the training sites of the 62B courses or at the office of the SME. Seven percent of the interviews were conducted in the office of the analyst. In all cases, the convenience of the SME was the prime consideration.

Working with the SMEs at their training sites reinforced the SMEs with coworkers for consultation and actual objects with which to refer to and upon which to demonstrate.

Coordination was accomplished through the chain of command with working details at the lowest level possible, which was very effective.

Many SMEs and verifiers were utilized in the 163 tasks of this MOS, necessitated by the great variety of items of equipment serviced by this MOS.

The organization of the tasks in the Soldier's Manual was used as the general pattern followed in analyzing the tasks.

The procedures detailed by or in the ETAP manual were followed. At the time that I most needed the guidance I did not have the background knowledge to read the manual with the desired speed and comprehension.

Instructional review was easily obtained as the SME and the verifier were both instructors. Those performing verification were conscientious.

SMEs and verifiers were all interested in improving the MOS field, improving the Soldier's Manual, and the TMs. Most of these men had recently returned from overseas assignments involving the MOS and spoke knowingly of the needs of improvements.

In the majority of tasks, both SMEs and verifiers consulted with fellow workers. The total project was much more of a team effort than the result of individuals.

No major problems developed. Local action corrected the problems by informal actions.

At no time was there a lapse in production. Effort was applied to another task, moved to another teaching area, do administrative work, etc. Cooperation and assistance from everyone was exceptional. Each person was genuinely eager to participate.

Problems and Observations - No major problems were encountered. The very wide variety of equipment repaired by this MOS demands extensive training by students which resulted in a large number of tasks in the Soldier's Manual (163). The construction equipment repaired by this MOS generally is very large, yet parts have tolerances into thousandths of an inch. The

same diesel engine installed two different items would usually have considerably different specifications. This variety within the MOS causes the repairman to refer to technical manuals frequently.

The MOS includes assignments from organization repairs to repairs in general support shops where skill level requirements would exceed the 10 and 20 level.

The soldier trains in only 40% of the tasks during residence instruction. Of the remaining 60%, the soldier will be instructed in very few tasks. He will be exposed to only tasks relating to equipment of the unit(s) to which he is assigned.

Upon completing AIT, this soldier is not qualified for his MOS. He is merely an apprentice. This situation is not recognized in the field. Commanders expect the individual to be a functioning competent mechanic.

All personnel have emphasized that the MOS is too broad in assignment skill levels and the MOS is responsible for too great a scope of equipment.

A problem frequently voiced by personnel from the field was the lack of the specialized tools for repairing the equipment specified in the TMs. The individuals did not know why the tools were not available.

SMEs state that some precision measuring tools are marked in fractions of an inch. The mechanic is given tolerances in decimals (hundredths or thousandths) of an inch. This results in errors in conversion which could just as easily be avoided by issuing precision measuring tools marked in decimal values.

Soldier's Manual - The tasks in the Soldier's Manual, FM 5-62B 1/2, were specific and in detail, serving as a progressive guide through qualification within the MOS.

The present manual needs editing to correct minor low-level errors. A number of tasks do not indicate that they require team effort, extensive equipment, and/or special tools. Some of the tasks cannot be completed in one workday.

In 163 tasks, not once was the word "troubleshooting" used. The technique was not utilized. Many times SMEs commented that they felt the technique should be well instructed and should be included within the tasks.

MOS SUMMARY - 62E HEAVY CONSTRUCTION EQUIPMENT OPERATOR

Pre-Analysis Approach - Pre-analysis consisted of conducting briefing sessions with the 62E officers and enlisted personnel to re-emphasize the project goals and to give them the procedures and requirements necessary to complete the analysis process. The POC had previously given an overview of the project some months earlier.

The Course Director wanted us to use a task list that was being revised in updating the SM, but it was determined that this was not feasible as it was only a preliminary listing and had not been staffed at Belvoir or at Leonard Wood.

The Course Director and RCA analyst reviewed task list together from current SM and decided the analysis would be divided among 4 NCO's in each of four vehicles to be analyzed: Crawler Tractor, Wheeled-Tractor Scraper; Scoop Loader; and the Motorized Grader. 32 Skill Level 10 and 7 Skill Level 20 tasks were included on task list.

Analysis Approach - Interviews were held in office area of the 63E enlisted personnel. The area was quiet and the reference materials needed were readily available. Interview sessions were held 3 mornings a week for 3-4 hours at a time.

A knowledgeable NCO was used for a detailed first interview on vehicle being analyzed.

The verification interview was conducted with a senior NCO on an ongoing basis three afternoons a week.

Instructor review was accomplished at Ft. Leonard Wood during week of Sept 13-17, 1982.

Problems - The major problem encountered was scheduling SMEs to perform analyses around the end of summer leave schedule. The most knowledgeable with most recent field experience was not always available, so the interview process took longer and was more difficult to accomplish.

There was some difficulty in getting SMEs to give a step-by-step detailed analyses; they were more interested in telling you what steps rather than how a task was performed.

It was found to be more difficult to perform the Instructor Review in a separate site as you have to brief the Instructor Personnel and get them on the same sheet of music.

Discrepancies - Some tasks put in SM at Ft. Belvoir were not taught at Ft. Leonard Wood. i.e., 051-191-1010: Tree Removal with Crawler Tractor cannot be performed due to Post regulations forbidding tree removal; 051-191-1011: Side-hill excavation is not done as a PE due to equipment damage that incurs. No 20-level tasks are taught at Ft. Leonard Wood and there is no 20-level course to attend. All 20-level tasks are to be Unit trained but SMEs say the Quality and Quantity varies greatly with the unit.

62E - 2

Soldier's Manual - The current SM dated 11 April 1979 was used as a basis for tasks to be analyzed. The SM is in process of being completely revised. Considerations is being given to combining skill levels I and II and to breaking tasks down to more definitive entities as steps given for major steps are now on too broad a level to be useful.

Personnel - The 62E Officer personnel were very helpful and cooperative. Some of section NCO's were not too happy with performing this detailed, demanding type work; however, when Senior NCO returned from leave this reticence disappeared.

Types of Knowledges Needed - Needs to know task related vocabulary in order to perform operating and maintenance tasks.

10 Soldier learns to operate 4 different kinds of wheeled (tracked) equipment so must have good hand-foot coordination. Must be able to read checklist in TM and LO's to perform preventive maintenance tasks on each of 4 kinds of motorized equipment.

MOS SUMMARY - 63G FUEL AND ELECTRICAL SYSTEMS REPAIRER

Analysis Approach - The POC at Aberdeen set up and presented a one-hour briefing on the goals of the BSEP Analysis Contract, the personnel requirements, and procedures for completing the analysis, verification and Instructor Review. The briefing was given to the officers and key enlisted personnel responsible for administering and participating in analysis of MOS. The briefing was given during the week of 19 October, 1981.

Interviews were held in the shop area to allow the SME to work/talk through the task being analyzed with equipment available. Interview sessions of 2-3 hours were held daily using one SME per session, but with shop resource personnel available for consultation, if required.

Verification interviews were done with a different SME when the task had been completed and written. Instructor review was done as a separate process. Five/six senior instructors were used for analysis of the 46 tasks. It was determined that 29.1 hours were spent as an average on each task.

Problems - As all SMEs were instructors, the analyst had to constantly insure that this was how the task was performed in the field and not how it was instructed in school. Some of the tasks given in the SM were not taught in the 63G course, i.e., master cylinder. Some tests given in the task statement were not taught, i.e., leakage test on Cumming in task 1069. Many different models of equipment were worked on in the field for a task, but only one model was available for analysis.

The TMs were a problem because of the following discrepancies:

1. Some TM procedures for assembly/disassembly were incomplete
2. In some TMs, steps were left out or were incomplete
3. Task 1084 - Pulley formula does not work on alternator
4. Task 1122 - Described procedure was confusing for test and assembly steps
5. Task 1138 - Spatial directions were given as seen from viewer at front and while facing tester
6. Task 2041 - No DS/GS manuals were available for GMC Diesel Engine diagnosis
7. Task 1059 - TM is incorrect one for engine given (Cummins)

Discrepancies - TM discrepancies were cited in problems above. All discrepancies were noted in Comments Section of TPA-1. Other discrepancies include the following:

1. Task 2035 - Troubleshooting is done by replacement of equipment
2. Task 2044 - (Troubleshooting Cummins Engine) no Cummins are available, so task is taught on TM 809.

63G - 2

Soldier's Manual - SM dated January 1981 was used to obtain the task number and task title. There was some disagreement by SMEs as to whether certain tasks should be in the SM or not, based on their field experience.

The division of task into Chapter 2 and Chapter 3 was a source of confusion, plus the Chapter 3 tasks only contained a number and a title with nothing on procedural steps.

Equipment - Includes Fuel Systems used on Wheeled Vehicles. Includes Electrical Systems used on Wheeled Vehicles. Includes PSG 6 and 12, Engine, Fuel, Injector Pump. Tools include Hand Tools, Special Tools, F & E Tool Box tools, 300 amp Generator, 500 amp Test Stand. All tools and equipment were listed on TPA-1.

Personnel - SMEs were provided on a timely basis by Senior Instructor. They were of excellent quality and made every effort to be helpful to the project. Each task was lengthy, which required a great deal of persistence by SME/Analyst to accomplish a task and eventually the MOS Analysis.

Types of Knowledges - Reading, comprehension, and reference skills are of utmost importance to the 63G soldier since he must access, locate data, read and understand information from manuals, as well as have the skill to read complex schematics.

Basic math skills are used for reading and interpreting gauges and identifying and manipulating numbers. The soldier in 63G uses principles underlying troubleshooting techniques.

MOS Summary - 63H TRACK VEHICLE REPAIRER

Analysis Approach - Each analysis session started off in a small lounge area. The tasks were stated as they appeared in the task list. A discussion followed as to the scope and nature of the task. In many cases, due to different SMEs and their unfamiliarity with the process, explanations of the project and the approach were necessary prior to any analysis. Procedures in the technical manual were immediately referenced. This ensured a necessary structure to the interview. It also provided a crosscheck to SME input. Analysis attempted to fill in gaps or clarify procedures in the technical manuals. The training areas were visited frequently not only to verify and identify procedures lacking or missing in the technical manuals, but also to give the analyst a greater sense of what he was analyzing. The analyst used an aggressive style of analysis in order to pry procedures written off to "common sense" or those assumed soldiers would know. Discrepancies between SMEs or between SMEs and the technical manual were attempted to be resolved through consensus.

Problems - The major problem encountered in 63H was a shortage of instructors, and in some cases a shortage of qualified ones. There is no sense elaborating on a problem experienced by the Army as a whole. The lack of qualified instructors, however, did present problems for a number of tasks. In some cases, tasks had to be rewritten or delayed. In other cases, a small number of tasks may have had gaps or inaccuracies. Nevertheless, considering the problems, the analysis went smoothly and without serious interruption. The 63H personnel were supportive and cooperative in this effort.

Discrepancies - The major discrepancies occurred in the technical manual. Occasionally, discrepancies occurred between SMEs, but as mentioned earlier, were usually resolved through consensus. Otherwise, discrepancies of any significance have been noted on the individual tasks.

Soldier's Manual - The Soldier's Manual was used very little as a guide through analysis. Occasionally, it would be referenced when some boundaries needed to be established for a task, but for the most part was used only to generate the task list.

Equipment - The 63H Soldier is responsible for using tools in various sets of tool boxes. Various special tools, identified in the tasks, are also necessary to use. Recovery tasks necessitate operating track vehicles. The STE/ICE stands out as the primary piece of test equipment that the 63H would be responsible for knowing.

Personnel - As mentioned previously, availability of SMEs was an ongoing problem. Occasionally, inexperience and lack of expertise on the part of SMEs was encountered. But for the most part, SMEs showed a high degree of professionalism despite an interviewing process which was tedious and cumbersome at times. Many of the SMEs viewed the process as challenging and important to their MOS. It provided an outlet for some of their frustrations about the training and the quality of soldiers, and perhaps opened their eyes a bit as to some of the assumptions they were making in their instruction.

63H - 2

Types of Knowledges - A wide spectrum of skills and knowledges were covered in the RCA Taxonomy in both math and reading. Basic math skills include reading and interpreting gauges, calculating measurements, solving mechanical advantage problems, along with the majority of computational skills. Basic reading skills include all the necessary skills in reading a technical manual and all the necessary writing skills in filling out forms.

MOS SUMMARY - 63N M60A1/A3 TANK SYSTEM MECHANIC

Analysis Approach - Interviews were conducted at various locations because 63Ns share training and training sites with several other MOS which have many shared tasks. 63Ns are expected to be proficient mechanics not only for the hulls and hull systems of M60A1 series tanks (which may have any of three different diesel engines), but also for the M151 (½ T. truck), the M35A2 (2½ T. truck), the M113A1/A2 (armored personnel carrier), the M578 (light recovery vehicle), and the M88/88A1 (medium recovery vehicle). In all, 63Ns are expected to be able to repair any of eleven different engines as well as many other components of each vehicle.

Most of the SMEs used for this MOS were instructors as well. In spite of a strong tendency to encourage the analysts to describe "school solutions" the SMEs were often quite candid in admitting that soldiers in the field depart from the procedures specified in the school's lesson plans.

ETAP procedures were followed; however, SMEs had to be led by the interviewers when major steps were requested. SMEs tended to see tasks as linear sequences of steps rather than as sub-systems which can be discretely identified as major steps.

Tasks were divided among three analysts, usually on the basis of systems within a vehicle (e.g., electrical, powerplant, suspension) or by particular vehicle (e.g., one analyst analyzed all of the M35A2 tasks).

Major Problems - The majority of the tasks listed in the Soldier's Manual are identified only by number and title. No conditions, standards, or performance steps are given; and in some cases the TM cited is for obsolete equipment (e.g., for the M60A2 tank).

Obtaining SMEs with recent field experience was an unresolved problem. For instance, our SMEs used for all electrical tasks were civilians who had been out of the service for at least 7 years.

Discrepancies - The new SPAs TMs contain numerous errors of varying seriousness -- such as incorrect procedures, erroneous page references, reversed diagrams, mislabelled diagrams, incorrect nomenclature. Some of the errors appear to have resulted from careless editorial work and proof-reading; others appear to have reflected a failure to understand the procedure.

Soldier's Manual - Majority of tasks lack conditions, standards, and performance steps.

Task titles fail to indicate equipment on which the particular task is to be performed. This results in confusion since there are separate tasks with same or similar titles for each of the vehicles cited above (e.g., "Install Powerplant").

63N - 2

Some tasks are on obsolete equipment (e.g., M60A2).

Some task titles imply a different procedure and task from that which is actually intended (judging from the Task Data Analysis Sheets provided by Aberdeen).

Equipment - M88s with V-12 gasoline engines are rarely found anymore, and the branch which teaches the M88/M88A1 tasks does not have one; yet there is a task for timing the magnetos on the V-12 gasoline engine.

M151s have been converted to electronic ignition systems which do not have points to be adjusted, yet the task for setting the ignition points on an M151 remains in the Soldier's Manual.

Personnel - Personnel were cooperative, courteous, and knowledgeable. They made time for our interviews even when they were short of personnel and/or had overloads of students.

Types of Knowledge Actually Required - Knowledges required represent a broad range of typical mechanics' skills such as tool use (particularly wrenches), use of measuring devices and gauges, ability to follow troubleshooting charts and written directions, and basic mathematics.

MOS Summary - 63W WHEEL VEHICLE REPAIRER

Analysis Approach - Analysis sessions took place at the location of training. SMEs were familiarized with the process of analysis and the purposes of the project when necessary. First, the task was stated as found on the task list. Next, discussion ensued as to the scope and nature of the task. Parameters were set and Procedures in the technical manual were immediately referenced. This ensured a necessary structure to the interview. It also provided a means by which to crosscheck SME input. Analysis centered around identifying these procedures along with clarifying or filling in gaps as necessary. The training areas were visited frequently to ensure accuracy, provide a more natural setting for analysis, identify additional procedures, and familiarize the analyst with the task. The analyst employed an aggressive style of interviewing in order to pry procedures written off to "common sense" or assumed soldiers would know.

Problems - The major problems faced in 63W were as follows:

1. Lack of availability of SMEs to conduct analysis. This resulted in a number of delays.
2. Too large a rotation of SMEs initially. This resulted in delays in terms of having to familiarize each SME with the process. Additionally, the "practice" curve was not allowed to build up, resulting in further time delays and poorer analysis results.
3. Too small a pool of SMEs for more highly technical tasks. As a result, availability became a problem, forcing time delays. Additionally, in some cases, analysis reflected in real terms only one person's expertise simply because that person was the only one knowledgeable about the task. It also increased SME "burnout".
4. A number of tasks where the SMEs clearly did not have the expertise and experience to analyze the task. This resulted in poor or inaccurate analysis, delays in rewriting, and/or a regurgitation of the procedures in the technical manual.

Discrepancies - Discrepancies, on a large part, resulted between inconsistencies in field applications and training exercises in the sense that equipment in training might never be found in the field or that entire tasks were never performed in the field. In addition, discrepancies resulted from procedures being able to be performed in a training setting, but for a variety of reasons not able to be performed in the field. Otherwise, discrepancies of a technical nature were for the most part resolved using a consensus approach. Discrepancies were noted on each of the individual tasks.

Soldier's Manual - The Soldier's Manual was used very little as a guide for analysis. Occasionally, it would be referenced when some boundaries needed to be set on a task, but for the most part was used only to generate the task list.

Equipment - The 63W is responsible for being familiar with the tools in the standard issue tool box. In addition, a variety of special tools must be used. Various measuring instruments such as the multimeter and STE/ICE are required as part of selected tasks. Recovery tasks require the operation of a number of different types of wheeled vehicle.

63W - 2

Personnel - SMEs in 63W showed a high degree of professionalism and cooperation. The analysis at times could become tedious and cumbersome and required all the personality traits needed to go through excruciating detail. The problems encountered have been mentioned previously and need not be repeated. Special commendation should go to those SMEs who carried the burden of many of the more highly technical tasks which were considerable in number.

Types of Knowledges - A wide spectrum of skills and knowledges were covered in the RCA Taxonomy in both math and reading. Basic math skills include reading and interpreting gauges, calculating measurements, solving mechanical advantage problems, along with the majority of computational skills. Basic reading skills include all the necessary skills in reading a technical manual and all the necessary writing skills in filling out forms.

MOS SUMMARY - 64C MOTOR TRANSPORT OPERATOR

Analysis Approach - The procedures followed were the results of several pre-analysis planning sessions. The assigned Army personnel and the analysis adopted the following procedures.

1. A weekly list of the tasks to be analyzed, and the list of the required publications (regulations, forms, etc.) was given to Sergeant in charge. Special attention was given concerning the choice of the SME, the verifiers and the instructor. The Sergeant responded with necessary lists, and the schedule planned and approved.
2. The analysis procedure was carefully explained to each of the SMEs to relieve any suspicion that he was being analyzed rather than the task. It was also important to impress the SMEs of the importance of the programs. After several analyses had occurred, the program proceeded smoothly.
3. The analysis usually took place in the morning; the afternoons were spent in completing the required recording. The various communications and suggestions from the home office made the recording a systematic procedure an easy format to follow.
4. The verifiers and the instructor reviews usually completed the weekly schedule.
5. Verifiers and Instructors were chosen with the expertise required of the task.
6. Supervisory personnel were most interested in the program and followed the progress by requesting frequent status reports. All were most interested and cooperative.
7. In several tasks, the analysis actually took place during teaching the task to the new soldier - this was further expanded with conversation and question before, during, and after the instructional period.
8. In several tasks, the first SME analysis took place during actual driving, in convoy, at night, during attack conditions - each of these were further expanded with conversations before and after the driving experience.

Major Problems - The only problem encountered was a lack of communication between the program and supervisory personnel, the office in charge of the program had received his new orders and his replacement had not reported on board during my stay at the fort. The course chief was excellent in helping to overcome the problem.

The analysis differed with the various SMEs because each of them had such diversified field experiences, their differences prompted occasional meetings of SMEs to clarify the analysis reports.

64C - 2

The instructional program did not use the MOS as an instructional format, however, every task in the MOS was instructed at some time.

The school taught only the driver-related tasks; the dispatching tasks were completed at the fort's transportation center.

Discrepancies - The Soldier's Manual was not used as a guide to the instructional program. During the program all phases of the manual were instructed, but not according to the listed tasks progression. The MOS listed tasks that were related to driving and to dispatching - those only related to driving were instructed. Dispatching was considered as "on the job training".

Soldier's Manual - See Discrepancies.

Equipment - The various pieces of equipment required for the instructional program were in abundance. A large portion of the equipment was obsolete and the rest was soon to become obsolete. Although all equipment was old, it was in excellent condition. Conditioning of the equipment was part of the instructional program.

Personnel - The school was greatly endowed with well-trained, interested, and competent personnel. Because of various field experiences, the approach to the interview varied among those interviewed in certain phases of instructing. The officer and administrative personnel was limited due to transfer and change of duty status.

Types of Knowledges - The knowledges required ran the entire range of knowledges. The use of the various pieces of equipment required a great deal of motor skills, coupled with terminology, recognition, and identification. Many of the tasks had various forms to be completed, filed and recorded requiring writing, reading, mathematics, and in some areas, the use of the typewriter.

MOS SUMMARY - 67G AIRPLANE REPAIRER

Analysis Approach - Interviews were conducted in the hangar area and in the 67G classroom/office. During the preanalysis planning period (1 week) the analyst sat in on classroom instruction for basic tool use, safety-wiring, DA Forms and use of Technical and Parts Manual. This enabled the analysis to gain a clear insight to the sub-activities associated in task performance and what is germane to 67G 10-level tasks. The original SME assigned, numbered the task list by order of performance and to enable the analyst to cross-reference tasks previously analyzed.

One verifier was assigned to review technical data for approximately 70% of the tasks, then the DTD Verification Committee and BSEP Civilian Committee was designated to review the remainder of the MOS. The DTD Committee focused attention upon technical accuracy and the BSEP Committee reviewed for ETAP format, level of detail and specificity. Instructor Review occurred continuously by a different SME (in more cases) throughout the analysis. Interview sessions were held 4-5 days per week, and in some cases five to six hours per day.

Problems - Three problem areas were identified in the analysis effort. The first problem area occurred on the first day of orientation between the analyst and SME, Verifier and Instructor. Due to the lack of a detailed briefing by the POC for military personnel involved with 67G analysis, a problem was created by their misinterpretation, misunderstanding and cooperation by the SMEs. The SMEs felt that the RCA project was a duplication of efforts with their own DTD analysis and considered the Project meaningless. This problem was finally rectified by the Site Supervisor through lengthy discussions and explanations on the project's objectives and the type of detailed analysis required. This hindered the analysis from the start but relations with the SMEs improved gradually. In addition, the POC did not verify SME availability and support for the RCA Project which continued to be an on-going problem throughout the analysis. SMEs were not always available and sometimes had to leave interview sessions prematurely.

The second problem concerned the analysts write-up approach in the areas of ETAP format and basic style, and identification of knowledges. This problem or rather a concern was quickly addressed by the assistance of RCA Home Office personnel and the Site Supervisor. The analyst with assistance, was able to bring the analysis effort up to project standards.

The third problem or concern was with the analyst's turn around time to submit ETAPs to the verifier and to the Home Office. It appeared that the analyst was spending too much time on each task such as the flow of effort: Interview session note taking, rewrite of the notes to actual project standards then notes were types into the ETAP forms. This approach by the analyst delayed the work effort. To speed up the process, the Site Supervisor reviewed the analyst's rewrite of the notes which appeared to be acceptable and thus typing was not required. The analyst felt that her typing ability (50 wpm+) would speed up the process but the original write-up was sufficient.

67G - 2

Discrepancies - None

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10-level is taught the use of basic hand tools. Some of the major equipment is taught hands-on under close supervision.

Personnel - Two SMEs were assigned with back-up personnel; however, problems with scheduling were frequent because the SMEs and back-up personnel were always in demand for instructional duties.

Types of Knowledges - Reading, comprehension, reference skills and basic math are necessary for the 67G soldier in order to obtain information from Technical Manuals and apply mathematics to task procedures.

MOS SUMMARY - 67N UTILITY HELICOPTER REPAIRER

Analysis Approach - Interviews for 67N (Utility Helicopter Repairman) took place almost entirely in an office setting. Work in the hangar was not a viable option, because while Ft. Eustis has propensity for this MOS, it is instructed at Ft. Rucker, so training aids and aircraft under work were not available for observation at this site. This was not a major handicap to the analysis effort, but probably served to slow down the process slightly, since all information had to be conveyed by verbal description alone.

The analysis approach included daily interview sessions with a single SME, who worked the task list from start to finish. A sequence was established that dealt with repair/replacement of aircraft components within various functional groups - tasks related to the rotor system, for example, were interviewed in sequence, with the task containing the most extensive procedures interviewed first to serve as a basis for cross-reference to other related tasks.

Forms and records tasks - many of which could be referenced to work completed for other MOS at this site - were interviewed first, followed by 10-level tasks grouped by related components and systems; the extension tasks and 20-level tasks were interviewed last. This sequence also corresponded roughly to the SMEs level of familiarity with the procedures being analyzed.

Questions about the meaning of task statements, i.e., which specific procedures should be included in the analysis, which models/types of components were to be the focus of the procedure - were discussed between SME and verifier prior to the start of the interview to assure that interview time would be spent most effectively.

The interviews were relaxed and unhurried, and resulted in extensive notes arranged in rough outline form. This made it possible for the interviews to be written up at a later date with little or no loss of accuracy and detail.

Discrepancies - No significant discrepancies found, although there was the expected amount of variation between field expedient procedure and process as per TMs.

Soldier's Manual - Current SM not available. Analysis was based on current task list and Job Performance Measures/Standards generated by DTD as pre-draft basis for new SM.

Major Equipment - Major equipment/test equipment rarely utilized for hands-on instruction because of cost; however, since most 67N work involves basic hand tools, this is probably not a major handicap for soldiers in training. 10-level soldier will be closely supervised during all operations.

67N - 2

Personnel - SME was available daily with little interference from other duties. Analyst was notified of anticipated TDY time well in advance. SME was highly experienced and knowledgeable; he was also very expressive, capable of verbalizing even the most complex procedural descriptions clearly and in detail. This was a major asset to the analysis effort, especially in view of fact that no aircraft were available for reference during the process.

The level of his familiarity with task procedures permitted the SME to "talk through" the steps without constant referral to TMs; the appropriate manual was always open, and served as a check on his memory and a framework for task sequence, but he did not depend on it for descriptions of task procedures.

The verifier - a member of the Army's own 67N task analysis team - was both familiar with the goals of analysis and with the details of 67N functional operations. He was thorough and painstaking in his review of task write-ups, and appeared to keep the project objective - identification of skills and knowledges - foremost in mind. His cooperation with analyst and SME proved very advantageous to the analysis effort.

Working with a single SME and a single verifier throughout the entire analysis of 67N was also an advantage. Continued daily contact allowed for a build-up of rapport and the formation of an effective working relationship that enhanced the overall quality of the product.

Types of Skills/knowledges required for task performance - Instructors suggest that critical skills include reading comprehension and referencing skills, since the entry level soldier is heavily dependent on the TMs for information. A less concrete but equally important element in this regard is initiative. The TMs for 67N, though adequate for their purpose, often fail to describe operations in a detailed, step-by-step manner; the soldier who is afraid to ask questions might have difficulty performing tasks with no more than the current TMs as a guide.

Basic math skills are also a necessity, for calculating measurements to specification, for interpreting gauges, and for manipulating numerical valves relevant to task performance.

Finally, instructors suggest that some familiarity with the use of basic hand and power tools would be an asset to the entry-level soldier in 67N.

MOS SUMMARY - 67T TACTICAL TRANSPORT HELICOPTER REPAIRER

Analysis Approach - Interviews were conducted both in the hangar area and in the RCA field offices. Interview sessions were held 4-5 days per week utilizing one SME per session.

The analyst and SME grouped the task list by helicopter systems and sub-systems order of events.

Two verification committees were assigned to complete the MOS. A DTD Committee reviewed the ETAP format, level of detail and specificity. Instructor review occurred throughout the analysis effort and at the completion of analysis.

Problems - The major problems encountered were the ETAP format, level of detail and specificity on a majority of tasks.

In addition, the DTD verification committee (only one person) was not briefed thoroughly on the responsibilities of the verification process. To remedy the problems in 67T, the Site Supervisor met with the POC, BSEP Committee and DTD Verifier to identify the weak areas of the analysis.

The analyst attempted to strengthen the analysis efforts prior to leaving the position.

The Site Supervisor assumed the role of analyst for 67T. In order to complete the work effort, many of the tasks required a rewrite of procedural steps, changes in the ETAP format and further detail on sub-step performances. In addition, 12 tasks had to be written from notes left by the former analyst.

With the rewrite of tasks and the strengthening of sub-step activities, the MOS was finally completed after considerable time spent on rewrite efforts.

In addition, the format analyst tried to save time on write-ups and interview sessions by using typed-out performance steps supplied by DTD from their In-Process-Review for 67T. Although it saved time during the interview sessions, the process of taping or gluing the information of steps to the ETAP format on TPA-2 became somewhat cumbersome, and difficult to follow for the verification committee. Thus this approach hindered the analysis in the sense to add additional steps for more elaborate detail.

Discrepancies - None, other than the fact that the Black Hawk Helicopter is relatively new to the Army's training structure and some of the interpretations of tasks for a 10-level needed further investigation by additional SMEs. Because of this situation, no SME actually had any field experience on the Black Hawk, but could transfer their experience from MOS 67N which a majority of SMEs had been certified.

67T-2

Equipment - The 10-level soldier at Fort Eustis is taught the use of basic hand tools and is given hands-on training for some of the major equipment.

Personnel - For the initial start of the MOS, a different analyst and SME began the analysis ~~work~~ and completed 3 tasks. The POC informed RCA that scheduling of an SME would have to be on a day-by-day basis; however, no real problem existed with the scheduling process. A new SME was assigned to the project with the analyst who worked on the remaining tasks.

Types of Knowledges - Reading, comprehension, reference skills and basic mathematics are required for the 67T soldier to perform the tasks. The Technical Manuals for 67T are written in a very simplified step-by-step procedure which enables the soldier to have a complete picture and detailed description of each task from equipment needed and step-by-step performance steps. Each task activity in the Technical Manual is divided by Helicopter System and then labeled as a "Task" activity.

WOS SUMMARY - 67U MEDIUM HELICOPTER REPAIRER

Analysis Approach - The approach to analysis changed after the first three months due to the SME tiring easily after the first hour of interviewing. The analyst decided to concentrate on tasks that were relatively brief and those the SME felt most comfortable with, and opted to save the write-ups for a later time in order to complete the interviewing with the SME. This approach worked out well, and the SME showed full cooperation. At one point, the analyst had approximately 35-40 tasks in note form, but felt that the notes were adequate to write the task, and that the verifier was very thorough. The verifier was used as the initial SME for the remainder of the analysis. The majority of the interviews occurred in the hangar setting which, for the analyst and the SME, made the analysis easier and more productive.

Discrepancies - The major discrepancy was the use of Anti-Seize Compound. It is applied to components as a light, thin coat to prevent seizure, any excess is to be wiped off. Many of the 67U personnel refuse to use it and instruct students not to apply the compound. They claim that it causes seizure of components.

Other 67U personnel explained that it will cause seizure only if too much compound is applied and if any excess is not wiped off. It is stated in the TM to use this compound which means it is mandatory. Failure to use anti-seize compound will cause seizure and permanent damage which can be costly.

This discrepancy was brought to the attention of the POC and is stated on several tasks.

Soldier's Manual - Only the draft soldier's manual was available. It was identical to the explanations in the TMs for each task subject area. Major steps and sub-steps were not always in order and some steps were not included. A 10-level could have great difficulty following the soldier's draft manual and TM's. Some of the subject areas were not properly listed under the topical headings in the TMs. Therefore, the soldier would have to do a lot of page turning to find the proper paragraph or illustration.

Equipment - The 10-level was exposed to the major equipment for "hands-on" training and under close supervision.

Personnel - SME's were available with little interference of other duties. Changes in SME roles such as initial SME and verifier occurred with the approval of the POC and Site Supervisor.

Type of Knowledges - The most important knowledges that the soldier needs to actually perform the job are those concerning reading, comprehension, and reference skills. The soldier utilizes the TM daily and must be able to follow written instructions.

67U - 2

Basic math skills are also necessary in order to perform measuring activities, reading gauges, and identifying numerical values.

The instructor's greatest concern for the type of student they are to train are those that have difficulty with reading and comprehension.

MOS SUMMARY - 67V OBSERVATION/SCOUT HELICOPTER REPAIRER

Analysis Approach - The approach was consistent with interviewing, immediate write-ups, and verification throughout most of the analysis. In preparation of periods which the SME would not be available, interviews were conducted in abundance so that the balance of the time was spent in writing ETAPs. This occurred at the end of the analysis for the last 30 tasks. Instructor review occurred at Ft. Rucker.

All interviews took place at the SMEs office in the Hangar setting. Although no tasks were taught or performed at Ft. Eustis, the OH-58 helicopter was available in the hangar. This greatly helped in the analysis effort.

Soldier's Manual - The Soldier's Manual or draft was not available, only a current task list was provided, dated 10/18/81.

Personnel - Sometimes it was necessary to schedule tasks on a daily basis. Only one SME was available as the initial SME. Interviewing could occur 2 hours one day or 8 hours the next. Every effort was made by the SME to provide as much time as possible.

Discrepancies - None.

Equipment - While at Ft. Rucker for Instructor Review, some test and major equipment was not provided to the student for "hands-on" training because of cost factors involved, although classroom instruction of the equipment and simulation tests were provided.

Type of Knowledges - As in the case of 67U, the actual skills needed to perform the job are those concerning reading, comprehension and reference skills. The soldier needs the ability to follow written instructions from the Technical Manuals.

Basic Math skills are also important to perform measuring activities, reading gauges, and identifying numerical values.

Instructors feel that reading, comprehension and reference skills are most essential.

As part of the training for 67V, instructors take the approach that the average 10-level soldier has never used common tools, so they instruct them from the basic of turning clockwise/counter-clockwise to the more complex of how to use the torque wrench and the various special tools.

MOS Summary - 67Y ATTACK HELICOPTER REPAIRER

Analysis Approach - Interviews for 67Y (Attack Helicopter Repairer) were held solely in the hangar area, thus enabling the SME and analyst to confer with instructors or view the helicopter when needed to complete a task interview accurately. Interview sessions were generally held 3-5 days per week, utilizing one SME per session. Five SMEs were required to complete the MOS due to SME "burn-out", instructor shortage, and special knowledge requirements. During the start-up of the MOS, the task list was divided into groups by the SME according to various aircraft systems. Tasks relating to the rotor system, for example, were approached in a short-to-long task sequence, with earlier tasks acting as building blocks for the later (and generally longer) tasks. Two verifiers were required to complete the MOS, both of whom were extremely cooperative and thorough.

Problems - The major problem encountered was SME "burn-out". A shortage of instructors evidently created pressure on the men which, when coupled with the demands of the analysis, caused a reluctance on the part of some SMEs to participate with the project. This caused some difficulty for the analyst to extract information: less information was volunteered, questions had to be more probing, and the interview setting became somewhat less relaxed. Nevertheless, given the instructor shortage situation, 67Y personnel were fairly cooperative.

Discrepancies - None, other than the expected difference in opinion between personnel on insignificant items.

Soldier's Manual - Only the Draft Soldier's Manual was available. Occasionally, steps were out of order or omitted. However, it provided a good guide for determining what to include in each task write-up. For example, a "replace" task might include the steps of "remove", "inspect", "clean", "install", and "take clearances"; or it might include only "remove" and "install" steps.

Equipment - The 10/20 level soldier is taught usage of basic hand tools, generally found in the tool box or tool room. Major equipment/test equipment is seldom taught hands-on, although the soldier may be exposed to it through VTRs, platform instruction, or demonstration in the hangar.

Personnel - SMEs were readily available for the first three months, after which 67Y seemed to experience an instructor shortage. SMEs were generally cooperative; the Platoon Sgt. in particular backed the project wholeheartedly. Verifiers were courteous and cooperative, as stated before, and no problems were experienced with availability.

67Y - 2

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 67Y soldier to possess since he must locate, read, and understand information in the TM daily in order to perform any task. Basic math skills are also required for reading and interpreting gauges, calculating measurements, and identifying and manipulating numbers.

MOS SUMMARY - 68B AIRCRAFT POWERPLANT REPAIRER

Analysis Approach - Interviews for MOS 68B were held solely in the hangar area, thus enabling the SME and analyst to confer with instructors or view the engines when needed to complete a task interview accurately. Interview sessions were generally held 3 to 5 days per week, utilizing from one to five SMEs per session. Tasks for each engine required different SMEs, since SMEs tended to specialize in only one or two (at most) engine(s). Eight SMEs were required to complete the MOS, not including the instructor-SMEs utilized to "draw loose ends together" and those conferring with the "main" SME on a task. Also, instructor shortage contributed to the usage of several SMEs.

The task list was divided by engine prior to MOS start-up. Tasks were approached (1) by category, as to engine, and (2) in a short-to-long task sequence within each category, with earlier tasks acting as building blocks for the later (and generally longer) tasks.

Problems - The major problem encountered was verification. Initially, a verifier from DTD was assigned who "rubber-stamped" the tasks through verification. He didn't utilize a TM during verification sessions with the analyst, and consequently found no errors. He also admitted a lack of knowledge with the subject matter. After repeatedly expressing discontent with this situation to the POC, and having seen no resultant action taken, the analyst chose to utilize a qualified SME from the hangar area. As a result, the POC became very upset with the analyst, instructing her never to do such again. Another "qualified" SME was assigned, who expressed extreme discontent with the arrangement to the analyst in "choice" language. These happenings were reported to the POC, along with the analyst's reluctance (refusal) to work with vulgar, uncooperative persons.

No verification took place for a month or so; the POC attempting to arrange a verification committee. Once formed, tasks were submitted, the bulk of which were not returned for a month or more. Tasks which had been previously verified in the present of the analyst were required to be submitted to the committee for reverification.

The committee tended to "rubber-stamp" tasks, providing little or no changes. When verification was performed on a one-on-one basis with the analyst and an SME working together, changes or suggestions were frequently made.

It should be noted that the persons from the hangar used by the analyst for verification to whom the POC had so strongly objected, were serving on the committee. The analyst found this to be an amusing, if not irritating, point. Also, generally one person was used to verify each task, thus eliminating the benefits of the POC's committee concept.

As a result of confusion surrounding verification, much 68B work was delayed.

688 - 2

Discrepancies - None, other than the expected difference in opinion between personnel on insignificant items.

Soldier's Manual - None was provided. The analyst used a task list dated 4/14/82.

Equipment - The 10/20 level soldier is taught usage of basic hand tools and special tools generally found in the tool box or tool room. Major equipment/test equipment is seldom taught hands-on, although the soldier may be exposed to it through slide presentations, platform instruction, or demonstration in the hangar.

Personnel - SMEs were, for the most part, readily available and very courteous and cooperative. Upon occasion, an instructor shortage arose, however, the Master Sgt. released his men to the analyst whenever possible.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 688 soldier to possess, since he must locate, read, and understand information in the TM daily in order to perform any task. Basic math skills are also required, for reading and interpreting gauges, calculating measurements, and identifying and manipulating numbers.

MOS SUMMARY - 68D AIRCRAFT POWERTRAIN REPAIRER

Background - 68D Task list consisted of 57 tasks; 8 were requested for deletion. 49 tasks were analyzed.

All 49 tasks were 10-level activities which involved repair, replacement, and inspection of components removed from the aircraft.

Analysis Approach - Interviews were conducted in the hangar area 3-5 days per week from the period of July to September 1982.

The MOS involved five different helicopters; CH-47, OH58, UH-60, UH-1, and AH-1. It was then necessary to group and analyze tasks by helicopter. The analysis effort involved six SMEs.

The CH-47 was the first group of tasks to be analyzed because of its detailed performance and it served as the basis for some of the routine cross-referencing of substeps for the other helicopter tasks.

Each task was written with the component already removed from the aircraft, the 10-level would then make repairs, replace parts and inspect components on a bench or in the shop setting.

Discrepancies - Task list indicated that all tasks are "resident trained", however some are taught OJT.

Soldier's Manual - Only a task list was provided by the POC, dated 5/24/82.

Equipment - The 10-level soldier is taught the usage of basic hand tools found in the tool box and tool room. A majority of the major equipment is also taught with hands-on training.

Personnel - No problems with SME time, availability, cooperation, or scheduling.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 68D soldier in order to locate, read, understand information and sequential steps in the TM for each task. Basic math skills are also required for reading and interpreting gauges, calculating measurements, and identifying numbers.

MOS Summary - 68F AIRCRAFT ELECTRICIAN

Analysis Approach - Interviews for 68F were conducted solely in the hangar and classroom setting. The availability of various aircraft and test equipment enabled the analyst and SME to approach the work effort with little difficulty.

The task list supplied by the POC listed the task statements in a general sense for "Test" and "Repair" performances. In the estimation of the analyst and SME, analysis of general task performances would be a very lengthy process and would not be completed by the end of the October completion date. Through the recommendation of RCA, the task list was suggested to be broken down by helicopter, the system/component to be "repaired" or "tested" and to analyze a problem most common to arrive in the actual field conditions. This approach was agreed upon by the POC, SME, and DTD Personnel.

Problems - As described in the Analysis Approach section, the first problem was the task list statements. Then the turn-around time for approval by DTD and the POC delayed the effort for two weeks. In addition, the original SME assigned had difficulty understanding the analysis effort and his time for the project was extremely limited (contrary to the thoughts of the POC). Finally, after about three to four weeks from the start of 68F, a new SME was provided who proved to be extremely knowledgeable, experienced, and well-prepared.

Discrepancies - None.

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10/20 level received basic theory of electricity and its application to "Repair" and "Test" performances. The soldier also received detailed classroom instruction and hands-on training on equipment and test sets that have designated BSEP I or AIT tasks.

Personnel - Two SMEs were provided for the analysis effort. The first SME was in demand for instructional duties, however his replacement was available until the analysis was completed. The 68F Instructional Branch was very cooperative with our SME needs, scheduling, and reference manuals.

Types of Knowledges - Reading, comprehension, reference skills, and basic math skills are the most important knowledges the 68F must possess. It is expected that, with these skills, a soldier is trainable in basic electricity theory and its application to helicopter repair. It should be noted that the reoccurring types of activities the 68F will perform is in continuity tests, reading a multimeter, reading specifications charts-tables from TMs and following procedures outlined in the Job Aid.

MOS Summary - 68G AIRCRAFT STRUCTURAL REPAIRER

Analysis Approach - Interviews were conducted solely in the RCA Field Office with occasional visits to the hangar area. Interview sessions were held 4-5 days per week utilizing the afternoon for write-up.

One SME was provided for the initial analysis and instructor review. Several verifiers were used to complete the review process.

The initial SME selected tasks from the list for a systematic analysis effort.

Problems - None.

Discrepancies - None.

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10-level soldier is taught the use of basic hand tools and receives hands-on training for major equipment for BSEP I Tasks.

Personnel - The analyst benefited by using the same SME throughout the analysis. The SME was well experienced, knowledgeable, and came well-prepared for interview sessions.

Types of Knowledges - Reading, comprehension, reference skills and basic math are necessary for the 68G soldier. Since the MOS concerns aircraft structural repair, the soldier needs to apply mathematics to cut, match, seal structural damage in aircraft structure and select appropriate size tools to make repairs.

MOS Summary - 68H AIRCRAFT PNEUDRAULICS REPAIRER

Analysis Approach - Interviews for 68H were conducted solely in the RCA Site Office. Due to the fact that the MOS is instructed at Chanute Air Force Base, this hindered the analysis for the lack of analyst observation and clarification of task content.

The task list was grouped by the SME into various types of repair functions. Interviews were conducted on a daily basis.

Problems - The major problem encountered was the lack of instructors as an additional input to the analysis. (See Equipment)

Discrepancies - None.

Soldier's Manual - Only a current task list was provided consisting of 34 tasks.

Equipment - The 10/20 level soldier is taught only in a classroom setting on various types of equipment or tools used for Pneudraulics Repair. The soldier may be exposed to audio-visual presentation of equipment use. The actual training is very limited to the 68H because instruction is provided only on Air Force components. Therefore the 68H will only gain some of the necessary theories of equipment use and functions.

Personnel - Two SMEs were available for the analysis, and served frequently as the initial SME and the other as a verifier. The initial SME proved to be very knowledgeable and experienced in his MOS. The verifier lacked field experience and relied heavily upon Technical Manuals to verify the ETAP. A military BSEP Staff member was utilized to conduct Instructor Review at Chanute Air Force Base at the end of the verification process.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 68H soldier to possess, since locating, reading, and understanding information in the TM daily are needed in order to perform any task. Basic math skills are also required for reading and interpreting gauges, calculating measurements and identifying and manipulating numbers.

68H - 2

Special Note: It was conveyed by the SMEs that the 68H soldier will have great difficulty once in the field when it comes time to perform repair upon Pneudraulic systems because of the lack of relevant training, and the only training received is on Air Force Aircraft Systems.

MOS Summary - 68J AIRCRAFT FIRE CONTROL REPAIRER

Analysis Approach - The start-up of task analysis was relatively slow. This was attributed to the initial SME experiencing the "burn-out" syndrome as an SME. He was more verbal on the platform than as an interviewer. This hindered productivity until communication established another SME to assist with analysis. After 3 months, the analyst was assigned another SME and utilized the same approach as with MOS 68M. All interviewing was conducted in an environment easily accessible to aircraft armament: 1) to accomplish clarity, and 2) for accuracy, expediency, hands-on and visual experience. The analyst utilized the interviewing technique first, thus saving the write-ups for last. This was done in an attempt to, hopefully, decrease the consumption time of the SME. However, the complexity and involvement of skills and knowledges pertinent to the analysis took us far beyond projected schedule to interview.

Soldier's Manual - None Used. A task list was used, dated 1-28-82.

Personnel - The SME and his superiors cooperated admirably to assist in any manner feasible to conduct the analysis. If initial SME was not available, an alternate was provided. Much of the time the analyst was able to work with two SMEs simultaneously - usually the 68M SME - and one would serve as a verifier to the other, as interviewed. As with 68M, interviewing was conducted 4 to 6 hours per day.

Discrepancies - SME felt some tasks duplicated others on the list, i.e., different task statement, but same task. Also, SME felt that some tasks were obsolete.

Equipment - This MOS is more electrical than mechanical. The soldier is taught how to troubleshoot and test equipment. One must trace wires on the aircraft using schematics. The soldier learns how to hook-up electrical and hydraulic power to the aircraft, also to BAGSE (Boresight Assembly Ground Support Equipment) and to boresight the aircraft. The soldier repairs and tests components on the aircraft. The student has access to an aircraft armament tool box. Performance of systems check-out is done for hands-on training also. The student is very closely supervised.

Types of Knowledges - Important knowledges a soldier needs to perform this MOS are reading, comprehension and reference skills. Math skills for calculations, i.e., finding percentages, tracing schematics, are also necessary. Some electrical background is an asset. The soldier engages in some mechanical work, however, the main job is to repair components on the aircraft and troubleshoot anything pertaining to armament system. Courses have been

68J - 2

extended into longer weeks for this MOS because it deals with repair and adjustment of electrical components, therefore, more emphasis is stressed on schematics and electrical components.

The soldier should be able to follow written instructions in accordance with the Technical Manuals.

MOS Summary - 68M AIRCRAFT WEAPON SYSTEMS REPAIRER

Analysis Approach - The approach to analysis was changed after the first 2½ months from an office environment to a hangar environment. The SME and analyst agreed it was pertinent to work in an environment easily accessible to aircraft armament -- 1) to accomplish clarity for the level of task analysis we were attempting and 2) for accuracy, expediency, hands-on and visual experience.

The analyst's approach was consistent with interviewing first and saving the write-ups for last. The SME and his superiors cooperated admirably to assist in any manner feasible to conduct the analysis.

At several points, the analyst had approximately 40-50 tasks in annotated form. The analyst did a re-write then submitted to the verifier. He was very thorough and cooperative with time.

Soldier's Manual - None used. A current task list was used, dated 1-28-82.

Personnel - The majority of the time an SME was available to interview. Usually if it was inconvenient to interview the initial SME, an alternate was assigned. If this was not conclusive, the analyst worked with the 68J SME and did a replicate analysis or vice-versa. Interviewing was conducted 4 to 6 hours per day. The initial SME made every effort to provide as much time as requested. At times, interviews were conducted for 8 consecutive hours, yet the SME was very zealous.

Discrepancies - SME felt some of the tasks were obsolete. A few of the tasks were taught without actual equipment, i.e., Align Airborne laser track with the BAGSE, but theory was only method of instruction.

Equipment - This is a mechanical MOS. The 10-level soldier had access to an aircraft armament tool box. The soldier was exposed to the auxiliary power supply to work on the aircraft's hydraulic unit and had to perform a systems operation check for hands-on training. The 10-level disassembles and assembles the components on the turret. This includes testing and replacing components on the aircraft, i.e., electronic component assembly. Testing with and without test set is performed on different components. A soldier disassembles the weapon, i.e., 40 mm grenade launcher and 7.62 machine gun. The student is closely supervised while engaged in hands-on training.

68M - 2

Types of Knowledges - Relevant knowledges for performing the MOS are reading, comprehension and reference skills. The soldier should be able to follow written instructions in accordance with the Technical Manuals. Fundamental math skills are necessary for measuring activities, reading mechanical and electrical gauges and identifying numerical values. The soldier should have some mechanical background and a small knowledge of tools.

MOS SUMMARY - 71D LEGAL CLERK

Analysis Approach - Two SMEs who were writing the 71D 10/20 Soldier's Manual served as initial and verifying SMEs for all 71D tasks. Initial and verification interviews were all conducted in the DTD/Soldier's Manual office area. Instructors came from the "schoolhouse" to the RCA office area. The analysts worked from photocopied working drafts of 71D tasks for a new Soldier's Manual which was not yet in coordinating draft form by the time the bulk of the analysis was complete. ETAP procedures were followed, except the request for the SMEs to identify major steps was dropped after several futile attempts. SMEs indicated that 71D tasks are of a sort that soldiers in the MOS think of them in terms of a chain of activities rather than as systems, subsystems, or clusters of related steps.

Major Problems - Working from draft copies of tasks which were being written and revised at the time was awkward. Analysis of one task had to be delayed for several weeks because the writer of the tasks was awaiting the arrival of a new form which was central to the task and which he had not seen. When the form finally arrived, the analysis was delayed again because there were parts of the form which no one knew how to complete; so an interpretation was required from the Judge Advocate General's office.

We did not see a complete Soldier's Manual until after analysis of the MOS was nearly complete. This circumstance made analysis planning difficult since we often received the draft copy of the task at the initial interview.

Indecision by the Army about new Article 15 procedures delayed completion of the MOS for nearly 9 months.

Soldier's Manual - Working from draft copies which in some tasks needed considerable editing and proofreading was sometimes confusing and misleading.

Some tasks in which branching occurs are plagued with much needless repetition because the writers branched too early in the performance steps; thus, many steps (which should have been preliminary to the branch) are repeated verbatim within each of the alternative branches.

Equipment - Only equipment used in training was typewriters which seemed in good condition and up-to-date.

Personnel - Personnel were excellent -- intelligent, cooperative, knowledgeable. The SMEs and the Instructors were precise and properly critical.

71D - 2

Discrepancies - None of any significance.

Depth/Type of Knowledge Required to Perform the MOS - 71Ds need to be able to read legal language with comprehension and with the understanding that legal language is precise and narrow in meaning. This requires not only a fairly high level of reading skills, but also the ability to force oneself to reread material in order to verify or correct one's first impression of what one had read. In addition, 71Ds need a solid command of written language, spelling, grammar, and punctuation. They must be concise, precise, and lucid in their written composition, clearly conveying exactly what occurred or was intended. Basic math is also needed for some relatively simple computations.

MOS Summary - 71L ADMINISTRATIVE SPECIALIST

Analysis Approach - 71L tasks for 10 and 20 skill level and 71L (ASI-F5) (Postal Clerk) tasks for 10 and 20 skill level were analyzed. Four soldiers in the Soldier's Manual section of the Directorate of Training Developments served as SMEs for the initial interviews, two for 71L and two others for 71L (ASI-F5). Three soldiers in the Soldier's Manual section (including the two who served as first SMEs) served as our SMEs for verification of the 71L tasks.

Since 71L course-work is conducted at Fort Jackson, the site supervisor took the 71L tasks there for the Instructor Review.

The 71L (ASI-F5) tasks posed a dilemma. At the time the initial 71L analysis was conducted, a major change was anticipated in the ASI-F5; therefore, although we completed 71L in July 1981, we were unable to begin 71L (ASI-F5) until January 1982. A soldier in the SQT section of the Directorate of Training Developments and Chief Master Sergeant Jarvis (U.S.A.F.) from Washington, D.C., served as our second SMEs for verifying the postal (F5) tasks. Since the tasks represented some major changes in procedure and were not yet being taught under the new rules and guidelines, no Instructor Review was conducted.

Major Problems - Since 71L was the first MOS attempted at Fort Harrison and since it was very early in the RCA/BSEP Project, determining an appropriate level of detail and identifying the level at which an SL10 or SL20 soldier would be expected to function were problems for the analysts.

The other major problems arose in relation to ASI-F5. The necessity of delaying completion of 71L until F5 could be addressed was more of an annoyance than a problem. We did encounter some difficulties, however, in the analysis itself since the SMEs were learning the new guidelines and rules at the same time that we were attempting to analyze how they would be applied in actual practice. This resulted in some re-writing which would probably not have been necessary had the SMEs been more familiar with the new structure of the tasks.

Discrepancies - None.

Soldier's Manual - In general, the Soldier's Manual for 71L is well-written in considerable detail.

Equipment - Since training for 71L is performed at Fort Jackson and no Instructor Review was conducted for ASI-F5, we had no opportunity to make any observations.

71L - 2

Personnel - Our SMEs were very knowledgeable, friendly, and cooperative.

Types of Knowledges - The knowledges required of a 71L or a 71L (AS1-F5) are those required of an efficient secretary, namely: alphabetizing, spelling, having an acceptable grasp of abbreviations, dictionary use, capitalization and punctuation skills, using a model format when typing a communication, proofreading, reading for the main idea in a communication, and using a numerical classification system. AS1-F5 also needs to be able to make changes.

MOS SUMMARY - 71M CHAPEL ACTIVITIES SPECIALIST

Analysis Approach - The procedures followed were the results of several pre-analysis planning sessions. The assigned Army personnel and the analysis adopted the following procedures.

1. A weekly list of the tasks to be analyzed, and the list of the required publication (regulations, forms, etc.) was given to Sergeant in charge. Special attention was given concerning the choice of the SME, the verifiers, and the instructor. The Sgt. responded with necessary lists, and the schedule planned and approved.
2. The analysis procedure was carefully explained to each of the SMEs to relieve any suspicion that he was being analyzed rather than the task. It was also necessary to impress the SMEs of the importance of the program. After several analyses had occurred, the program proceeded smoothly.
3. The analysis usually took place in the mornings; the afternoons were spent in completing the required recording. The various communications and suggestions from the home office made the recording a systematic procedure and an easy format to follow.
4. The verifiers and the instructor reviews usually completed the weekly schedule.
5. Verifiers and instructors were chosen with the expertise required of the task.
6. Supervisory personnel were most interested in the program and followed the progress by requesting frequent status reports. All were most interested and cooperative.

Problems - The major problem encountered was the shortage of SMEs with recent field experience. Many of the SMEs had not experienced field work in many years. The staffs of the school, both in the project planning and in the instructional field, were greatly below normal complement. The Chapel Assistant Specialists were most competent in the MOS related tasks; however, in the other tasks they had little to offer (again from lack of recent field experiences). In areas of the transportation tasks, they had little to offer the analysis procedures.

It became most difficult to obtain the necessary manuals, regulations, and the forms necessary to complete the analysis in these common tasks. Even the fort library could not supply all of the requirements.

Discrepancies - The Soldier's Manual contained a number of omissions and mistakes. In some cases the conditions and procedures to follow did not lead to the correct conditions. In other cases, the picture settings of the various chapel arrangements were either incomplete, or incorrect. The tasks involved with the Jewish faith seemed to contain more inaccuracies than the other faiths. All of the above observations and inaccuracies were reported as requested to the task force involved with updating the manual.

Soldier's Manual - The manual was followed completely. Since the date of the manual was '81, it was for the most part updated. All omissions and mistakes were reported to the task force re-writing the manual as per their request.

Several of the tasks listed relating to reconciliation of funds were under the advisory committee but were handled completely by civilian programs at the fort level.

The tasks listed under the general heading of transportation were difficult to analyze because of a lack of recent transportation experiences, however, the tasks were analyzed.

Equipment - The use of equipment was minimal, but those required were the various religious appointments according to each faith for the different types of chapel settings. The settings were for masses, weddings, marriages, burials, etc. All equipment and robes were in excellent condition and stored in appropriate manner.

Personnel - The problem that existed was the fact that all phases of the program was undermanned. All of the SMEs and verifiers were far removed from any field experience. All were cooperative, professional and eager to be a part of the program. The officer and administrative personnel were abundant and most interested in the program.

Types of Knowledges - The knowledges required to perform the tasks were mainly pertaining to identification, terminology, recognition, and the coordination of these knowledges. In the completion of those tasks which required the completion of various forms, reading and writing knowledges were required. Some of the tasks required the use of the typewriter; therefore, certain motor knowledges were required. Some of the tasks were related to the keeping records of funds and those required the understanding of various phases of mathematics. In the area of the common tasks the whole knowledge summary was required.

MOS SUMMARY - 71P FLIGHT OPERATIONS COORDINATOR

Problems - The analyst did not encounter any significant problems during the analysis.

Discrepancies - No major discrepancies were cited during the analysis.

Soldier's Manual - The Soldier's Manual relied heavily upon abbreviations and acronyms. The analyst found the manual difficult to follow for this reason. The FM also referred to a number of other technical manuals. The analyst concurs that it might make the steps easier to follow if the soldier's manual listed the steps instead of just providing a reference.

Equipment - Flight operators use a variety of different equipment ranging from forms and flight publications to radios and emergency equipment. All equipment was available for the analyst to observe during training (school) hours at the air fields.

Personnel - Fewer flight operators were available to the analyst because a number of personnel were on leave or currently being transferred. The small group of operators associated with the project helped create a more consistent product.

Knowledges - Proper communication and safety precautions proved to be two of the key knowledges essential for performing as a flight operator. Clerical duties appeared to be an important function also.

MOS Summary - 71Q Journalist

Analysis Approach - Tasks were divided among the three analysts. Analyst conducted interviews in 71Q office area with first SMEs and at the school with second SMEs and instructors.

The ETAP Manual was not used during 71Q analysis as analysts were familiar with the procedure by then.

Major Problems - Delay in completion because of decision by site supervisor to work on other MOS.

Instructor reviews on developing tasks (black and white film and black and white photographic prints) had to be done with 83E because 71Q SMEs do not know the tasks (and receive very cursory instruction on them). Because 71Qs do not know the tasks (and soldier's manual has them wrong), extensive re-writes of the tasks was required.

Discrepancies - None other than those noted in SM section.

Soldier's Manual - Inclusion of tasks on developing film and prints which SMEs indicated are not done by 71Qs. SMEs stated that 83Es (photo and layout specialist) don't permit 71Qs in their labs.

Some tasks incorrectly written (see major problems).

Some tasks, written by civilian personnel, reflect civilian rather than military orientation.

Equipment - None

Personnel - Cooperative and knowledgeable, except for developing tasks.

Depth/Type of Knowledge - 71Qs operate with less immediate direction by supervisor than is expected of most soldiers; thus, the depth/type knowledge required is somewhat greater than might be expected in other MOS. Expectations seemed realistic. SMEs readily acknowledged that the new 71Q will function at a modest level until field experience has been gained.

71Qs must have strong reading and composition skills, including spelling, grammar, vocabulary, sentence, and paragraph writing.

MOS Summary - 72E Telecommunications Center Operator

Analysis Approach - An initial meeting with the course chief of 72E was planned at 1300 for February 12, 1982. Actual start date was February 24, 1982. Interviews for the first half of the analysis were held at the 72E course site. Interviews for the second half were held at Willard Training Area. Analysis write-up took place in room 211, Brant Hall. Instructor review occurred at Brant Hall, Willard Training Area, and Burkhardt Hall 72E.

Preanalysis planning consisted of meeting with the course chief and BN Commander with RCA analyst. The analysis schedule was planned in blocks of tasks to correspond with sections of the course so that segments of the schedule were completed conveniently. The course chief was furnished a list of tasks and provided the recommendations and guidance for each of the segments, coordinating SMEs accordingly.

Problems/Discrepancies - Some SMEs for the DST van and the MGC 23 radio were not available. SMEs outside the course were found for partial completion of the DST van tasks to assist with the analysis. None were found for the MGC 23 radio.

Soldier's Manual - Some typographical errors in the Soldier's Manual were noted.

Equipment - As was stated previously, most of the tasks dealing with the DST van and the MGC 23 radio were difficult to analyze, due to nonavailability of SMEs. These pieces of equipment are relatively new, therefore, few SMEs have had field experience with the equipment.

Personnel - SMEs met with the RCA analyst on a daily basis for 2-4 hours each weekday morning for interview purposes in the analysis of each critical task. SMEs chosen were those who had had recent field experience in the MOS. Course instructors served as reviewers and verifiers. All personnel were extremely cooperative and knowledgeable.

Types of Knowledges - SMEs must be able to type using the teletypewriter. They must be able to use various publications to determine codings to transmit messages. Simple math skills are required to do time analysis and time conversions. SMEs must have a certain amount of mechanical ability to perform preventive maintenance on equipment. Because some tasks require lifting of heavy objects, SMEs must be in good physical condition. Being able to read and use circuit diagrams is a necessary skill of 72E soldiers. Good reading and handwriting skills are required to complete forms and maintain daily logs. SMEs must be familiar with safety and security measures appropriate for the different tasks in the MOS. Estimating distances is a necessary skill for the soldiers, along with reading and using various kinds of maps and charts. Finally, SMEs must be able to recognize and identify components on pieces of equipment and know how they are moved or positioned to complete a task activity.

MOS Summary - 74D COMPUTER/MACHINE OPERATOR

Analysis Approach - We used a committee approach for the initial interview, verification, and instructor review, with the analyst present for all three phases. Three instructors served on the committee for most of the interviews (one instructor was re-assigned during the period of the analysis) and several other instructors (possible as many as eight or ten) assisted on one or two tasks each for which the core of the committee felt they needed additional expertise.

Major Problems - A number of the tasks in the 74D task list are not truly tasks. For example, "Affixing a Magnetic Marker to a Magnetic Tape" is never done apart from performing other closely related operations on the tape and requires about 20 seconds.

Because of the many variations of equipment configurations and the idiosyncracies of local SOPs at Data Processing Activities, few specifics could be written about a majority of the tasks.

Initiation of analysis on 74D was delayed for several months because decisions concerning what equipment, how many configurations of equipment, and what sorts of programs were to be analyzed had not been made.

Discrepancies - None.

Soldier's Manual - One task had only the word "NONE" under Performance Steps. A number of tasks, as noted above, were not really tasks. SMEs indicated that some essential tasks for 74D had not been included in the task list. The number of tasks lacking content in the Manual convey an impression that there is little substance to the MOS.

Equipment - The equipment on hand seemed adequate for training purposes.

Personnel - Our SMEs were knowledgeable, friendly, and cooperative.

Types of Knowledges Required - Among the knowledges required for a 74D are an aptitude for attending to coded data, a capability for transcribing coded information accurately, good recognition of numerals, letters, and symbols, ability to find necessary information in a source document (often a very sizeable volume or set of volumes) quickly and accurately, and ability to use reference materials to find specific information.

MOS SUMMARY - 74F PROGRAMMER/ANALYST

Analysis Approach - What amounted to a committee approach was used with the main group of tasks. Several instructors were interviewed for each task. A consolidation of the results of the interviews was used in the task writeups. Similarly groups of instructors were used for verification and instructional review. Replicate analysis procedures were used for several tasks for which analysis had been accomplished in MOS 71L and 74D.

Problems - The major concerns during analysis were dealing with task statements (less than 10) which were written to encompass performance for skill levels 10 thru 40 and a multitude of programming languages for which additional training is often provided. The task statements were written in such broad and general terms, as were the performances standards listed in the Soldier's Manual, that no readily apparent level of performance could be described for the 10- and 20-level soldiers. Much of the analyst's time was devoted to attending meetings at which this issue was discussed. As regards the second area of concern, there was general agreement that analysis results should reflect the COBOL language for an IBM 360/370 series computer.

Discrepancies - No doctrinal discrepancies were noted. However, because the responsibilities of the 74F are so ill-defined at the various skill levels, it is apparent that there is wide diversity in tasks actually performed on the job. Consequently, a heavy burden is placed on field locations to provide specific training related to the duty assignment; i.e. programming language and operating system.

Soldier's Manual - The August 1981 version was used. As noted above, it provided very little guidance to the effort.

Equipment - It appears as though the U.S. Army maintains a diverse inventory of data processing equipment which requires duty specific additional training. The IBM 360/370 series was used throughout analysis as the basic type of equipment.

Types of Knowledges - Key skills required by the 74F involve written and numerical expression. To cope with programming languages requires attention to detail in using codes, words, and symbols. Reference skills are also essential.

MOS Summary - 75B Personnel Administration Specialist

Analysis Approach - The site supervisor assigned 75B tasks to himself and the other two analysts. To some extent the assignments maintained continuity with related tasks which the analysts had already analyzed in 71D and 71L.

Analysis and verification interviews were all conducted in or near the RCA office space at Fort Harrison with SMEs who had participated in writing the new Soldier's Manual for the MOS. Instructor reviews were conducted in the same area with instructors from the "schoolhouse". In general, ETAP procedures were followed; however, it became apparent very early in the MOS analysis that SMEs were distressed by the request to identify major steps and had considerable difficulty in doing so.

Major Problems - Analysis of the SIDPERS (Standard Installation/Division Personnel System) tasks was complex and at times difficult, the difficulty being amplified by the fact that the SIDPERS tasks were distributed among all three analysts.

The analyst experienced a communication problem with one SME. The SME was intelligent, pleasant, cooperative, and knowledgeable; however, English was his second language. His use of English idiom was rather unusual, and on occasion, communication between analyst and SME did not quite mesh.

Discrepancies - None of any significance.

Soldier's Manual - Some task descriptions seem overly detailed (e.g., "Enter a period (.) in the next box").

There is some tendency to treat the completion of forms as if completing forms were done for its own sake, thus losing sight of the personnel and personal transactions which are what the task is really about.

Several Skill Level 10 tasks refer to using Army Regulations requiring the 75B to read and make judgments based on the content of the AR. The SM tends at times to imply that a 75B10 will interpret the AR. In actual practice, the 75B should only apply specific directions/mandates of the ARs, not interpret what they intend nor mean to other soldiers.

75B - 2

Equipment - Only equipment involved was typewriters which appeared to be in reasonable good repair.

Personnel - SMEs and Instructors were cooperative, knowledgeable, and meticulous about details. Their tendency to rely on acronyms (and there are many in the 75B field) frequently required explanation and restatement.

Depth/Type of Knowledge Required - 75Bs need to be able to read at an average or above average level since they often must derive information and follow specific directions (often quite detailed) from ARs and DA Pams, particularly when performing SIDPERS tasks. They also need basic math skills and mastery of basic grammar, spelling, and punctuation.

MOS SUMMARY - 76C EQUIPMENT RECORDS AND PART SPECIALIST

Analysis Approach - Interviews for 76C were held primarily in the offices of the SME. This approach allowed the analyst easy access to forms and job references. SME's were readily available and several were used because of the different areas of specialty within the MOS. Both the original SME and a second instructor were used in the verification process. Since the Soldier's Manual was being revised the instructional review process took note of the intended POI changes.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. There was some variability in the requirements to make all entries in pencil during training, when doctrine requires pen entries in many instances. The use of DD form 1348-1 was not included in the Soldier's Manual.

Soldier's Manual - A 1982 draft version was used. SME's were very thorough in checking Soldier's Manual references against technical manual and regulation changes. The Soldier's Manual appeared well organized and up-to-date. In some cases steps listed on figures (drawings) proved difficult for the analyst to follow. Perhaps a step-by-step outline of what the soldier is to do might prove more helpful.

Equipment - There is no major equipment associated with this MOS, other than a microfiche reader.

Types of Knowledges - All subskills shown on the taxonomy for completing forms and for referencing information in publications, on charts, and in tables are essential. Attention to detail in copying printed information and making extensions and totals are also important.

MOS SUMMARY - 76P MATERIEL CONTROL AND ACCOUNTING SPECIALIST

Analysis Approach - Interviews for the 76P were held in the offices of the SME and the analyst. Several SMEs, verifiers, and instructors were required to complete the MOS due to special knowledge requirements. Interviews were held 3-5 days per week for 4-5 hours per day. Verification of the analyses consisted of the initial SME and the verifier reviewing the tasks with the analyst for accuracy and clarity. Instructor reviews consisted of the instructor reviewing the tasks with the analyst for accuracy and to determine what steps were not taught.

Problems - No major problems were encountered.

Discrepancies - No major discrepancies were noted.

Soldier's Manual - The draft Soldier's Manual was very accurate and complete.

Equipment - No major equipment is used.

Personnel - 76P personnel were readily available and cooperative.

Types of Knowledges - Reading comprehension and reference skills are the most important knowledges required for the 76P soldier.

MOS SUMMARY - 76V MATERIEL STORAGE AND HANDLING SPECIALIST

Analysis Approach - Interviews for the 76V were held in the classroom. Interviews were held for 5-6 hours per day for 4-5 days per week. Several SME's were needed to complete the MOS due to special knowledge requirements. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses took place in the classroom with the initial SME, the verifier, and the analyst. The tasks were verified for accuracy and clarity. Additions, deletions, and/or rewrites were made as a result of the verification process. The instructor review for the analyses took place in the classroom. The tasks were reviewed by the instructor with the analyst to determine what steps were not taught.

Problems/Discrepancies - One major problem was getting personnel knowledgeable in the areas of packaging and preservation. This is a specialty within 76V and is trained through correspondence courses as noted in the analysis results. There was some variation as to how to most safely and efficiently operate the forklift with palletized supplies. Also some variation was noted in field procedures for processing incoming supplies and selecting supplies for issue or shipping.

Soldier's Manual - A draft version, dated 1981, was available. Because references to regulations and manuals were not completely updated, it was not heavily relied upon.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Most equipment items have been standard in the inventory for many years and have well established operating and maintenance procedures.

Types of Knowledges - 76V soldiers rely heavily on reading procedures which provide guidance for completing various forms. All subskills associated with form preparation are essential. Spatial orientation and environmental observation skills are essential. To handle publications and regulations, referencing skills are required.

MOS SUMMARY - 76W PETROLEUM SUPPLY SPECIALIST

Problems - The availability of trained personnel proved to be a major problem during the analysis.

Discrepancies - No major discrepancies, other than the soldier's manual (as indicated below) were cited by the analyst during the analysis.

Soldier's Manual - The Soldier's Manual that was issued to the analyst contained a number of discrepancies and mistakes. A corrected copy was used instead.

The analyst noted three major areas of discrepancies in the Soldier's Manual. First, the examples included for clarification were written as part of the task. The analyst found the examples misleading because they made it appear as if they were the only possible answer or situation to be encountered when completing the task. Second, the steps that proved to be identical to those listed in other tasks did not use the same format. The SME attributed the use of different formats to the fact that different personnel had been responsible for writing different tasks. Third, the analyst found those steps listed on figures (drawings) difficult to follow. The analyst concurs that a step-by-step outline of what the soldier is to do might prove more helpful.

Equipment - All petroleum equipment was available to the analyst for observation during training (school) hours. Only authorized personnel were allowed to demonstrate the equipment.

Personnel - The analyst worked with a number of different Subject Matter Experts during the analysis. Their knowledge appeared to range from superior to very poor. The analyst asked that one SME be excused from the project. Additional job duties often made the more knowledgeable personnel unavailable.

Knowledges - The most common knowledges that appeared repeatedly throughout the analysis were those pertaining to preparing forms, completing forms, and transferring data from one form to another. Directions in assembling/disassembling pipes, hoses, and valves proved essential in completing certain tasks.

MOS SUMMARY - 76X SUBSISTENCE SUPPLY SPECIALIST

Analysis Approach - Interviews for the 76X were held in the SME's work area. This approach afforded the analyst access to all forms and job references. A team approach was used for verification and instructional review. The 76X team members involved in the analysis proved to be most cooperative and knowledgeable. The analyst was given first priority to designated personnel at all times. Such an attitude toward the project enabled the analyst and SME's to complete work in an efficient manner.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. This was the smoothest analysis effort at Fort Lee.

Soldier's Manual - The April 1981 versions of the Soldier's Manual was used. It appeared to be well written and SME's were very capable of supplementing it.

Equipment - There is no major equipment associated with this MOS, other than a microfiche reader.

Types of Knowledges - The knowledges that appeared repeatedly throughout the analysis were those pertaining to preparing forms, completing forms, and transferring data from one form to another. Basic skills of counting, adding, subtracting, multiplying, and dividing are essential. Denominate numbers are used frequently.

MOS SUMMARY - 76Y UNIT SUPPLY SPECIALIST

Analysis Approach - Interviews for the 76Y were held in the classroom and offices of the SMEs. Several SMEs were used due to special knowledge requirements. Interviews were held 5-6 hours per day for 5 days per week. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses consisted of the analyst, the initial SME, and the verifier reviewing the tasks for accuracy and clarification.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. However, there was considerable discussion and rewrite during the verification. This resulted because the 76Y performs duties in a variety of settings and most regulations and manuals are written to allow for these variations. The analysis results rely heavily on the regulations and manuals, thereby avoiding the rewriting of specific procedures and doctrine.

Soldier's Manual - A 1981 draft version was utilized. It provided a comprehensive guide to task performance. SMEs were very diligent in checking all references to procedures.

Equipment - Major equipment items were available for examination by the analyst. It appears as though some types of automation may be introduced into 76Y in the near future. This may require expansion of the task list.

Types of knowledges - Skills required to initiate and complete forms and to transfer information from one form to another are critical. Referencing skills are essential because the 76Y comes in contact with publications which use a variety of formats. Verbal communication skills are important because of the "in between" position of the 76Y. Basic counting and mathematics computational skills are necessary for inventory tasks.

MOS SUMMARY - 82C FIELD ARTILLERY SURVEYOR

Personnel - An almost identical information base common to one category of Subject Matter Expert (SME) interviewed seems to reflect an identifiable marginal performance level among some few 82C soldiers. These SMEs demonstrate in-depth knowledgeability with reference to a particular piece of survey equipment, a particular principle, and the application of these particulars in field artillery survey. Since SMEs within this category invariably articulate poorly, however, perhaps parameters extraneous to expertise contribute to their performance. A recommendation for SMEs within this category is remediation with an emphasis on cross-training.

According to the analyst, significant scope of knowledgeability, with a concomitant high-level of performance, characterizes another category of 82C SME. Whereas the aforementioned category of SME evidences a non-eclectic approach to the 82C MOS, in contrast, SMEs in this category maintain updated information (obtained by keeping abreast of changes in doctrine), proficient manipulation of all required equipment (gained by working frequently with the equipment), and alternative solutions to a wide variety of field circumstances (learned both from first-hand experience and from selective research).

These SMEs extrapolate, and substantive responses as well as structured time-management procedures are hallmarks of their professionalism. Representative of a top-echelon professional within this category, the SME responsible for the majority of interviews conducted during BSEP analysis shows optimal methodological capability.

Draft Soldier's Manual - Dismiss it.

Types of Knowledges - Beneficial to an 82C Entry-level soldier's success are such prerequisite skills and knowledges as acute spatial perception, adeptness at swiftly performing simple mathematical processes, ability to solve basic algebraic equations, affinity for operating both electronic and mechanical measurement devices, and tenacity to carry out detailed step-by-step procedures. According to the analyst, proficient 82C SMEs rely heavily on such skills and knowledges in order to conceptualize and then implement a meaningful schema of field artillery survey in relationship to field artillery objectives.

MOS, In General - The amount of theoretical understanding offered during AIT to the entry-level 82C soldier decreases each and every year, say the SMEs, because technological innovations lessen ever increasingly the necessity of theoretical studies. Sophisticated engineering in electronics is turning the 82C soldier into a button pushing type, so say some SMEs, who also point out that such a soldier may find himself at a loss on the battlefield if electronic gadgetry fails him. On one hand these SMEs argue for an increase in the entry-level soldier's time spent studying theory; but, on the other hand, they also number the days until technology renders the traditional field artillery survey party obsolete.

82C - 2

Equipment - One major piece of survey equipment is cited as unavailable for analysis, the ABLE gyroscope. SMEs say ABLE is unavailable because it is soon to phase-out from the Army's inventory of equipment.

Problems - With reference to major problems encountered during BSEP analysis of MOS 82C, no major problems occurred.

MOS SUMMARY - 91B MEDICAL SPECIALIST

Analysis Approach - Analysis was conducted at the Medical Specialist building. Approximately 60 to 70 percent of the analysis was performed with Subject Matter Experts (SMEs) working in the office. On a number of occasions, the office responsibilities of the SMEs conflicted with their availability to be interviewed. This was resolved when instructors on two-week breaks were brought in to serve as SMEs in the analysis. Due to the level of detail desired and the variability inherent in some of the tasks, task interviews could be a trying and rather difficult experience for some SMEs, especially those who did many tasks. The analysis approach concentrated on those tasks serving as a building block for others. Tasks were also selected based upon the expertise and experience of the SME. For example, those SMEs with front edge of battle area (FEBA) experience were selected to do FEBA related tasks, or an SME particularly knowledgeable in burns would be selected to do burn tasks. Many times individuals with expertise in a certain area were sought after for specialized tasks. One additional approach needs mention. All 210 Series tasks reflecting combat conditions (i.e., wounds, fractures, etc.), were analyzed in the context of surveying, evaluating, and triaging combat injuries. Examination of these tasks will reveal the approach taken. In terms of analyst styles in the interview process, both analysts could be categorized as using an aggressive style.

Problems - The problems experienced were typical of prior ones: occasional SME "burnout", shortages of SMEs at times, and instances of SME inexperience or knowledge gaps for certain tasks. For the most part, however, these problems were overcome with minor interruptions to the analysis effort.

Discrepancies - Major discrepancies occurred in two major areas: burns and triage. There was a wide diversity of opinion in these areas and it appeared students were receiving different thoughts in these areas based on the instructor. Otherwise, all attempts were made to resolve discrepancies between two or more SMEs. Most discrepancies were noted on the tasks themselves.

Soldier's Manual - No soldier's manual was available. Analysts worked from a task list exclusively.

Equipment - There is a wide variety of equipment the 91B is responsible for using. Measuring instruments, hospital equipment, aid bag supplies, etc. comprise only a few of the categories necessary.

Personnel - The personnel, especially the core group of SMEs in the office, are to be highly commended for their cooperation and contributions to this analysis effort. Many times the SMEs were forced into a kind of juggling act between their work responsibilities and the analysis.

91B - 2

In addition, many who participated gained a certain satisfaction in correcting some of the wrongs they perceived. On the whole, the SMEs demonstrated high levels of expertise and professionalism.

Types of Knowledges - The basic skills and knowledges covered most of the skills on the RCA taxonomy. A 91B is almost assured of running into difficulty without basic reading and math skills. In addition, technical knowledge in basic anatomy, physiology, and biology is essential to success.

MOS SUMMARY - 93J ATC RADAR CONTROLLER

Problems - The Subject Matter Experts displayed a very confused view of the project, how an analysis was to be completed, and what the data was to be used for. The analyst attributed this to the amount of time required to complete the analysis and the different analyst involved.

Discrepancies - The analyst cited no discrepancies during the analysis other than those listed above.

Soldier's Manual - The Soldier's Manual contained very long and descriptive paragraphs of what the soldier was to do. The paragraphs contained much information that was not essential for completing the task.

The examples included for clarification were written as a part of the task. The analyst found the examples misleading because they made it appear as if they were the only possible answer or situation to be encountered when completing a task.

Equipment - Forms and flight publications were available to the analyst. Air traffic equipment was only available during training (school) hours when accompanied by authorized personnel.

Personnel - The personnel involved in the completion of the analysis were very helpful considering the circumstances. The analyst found that certain personnel held very confused views concerning the project. There was limited availability of feedback concerning certain tasks.

Knowledges - Those knowledges involving directions proved to be very important when operating air traffic control equipment. Good communication between the controller and the pilot proved essential.

MOS Summary - 94B Food Service Specialist

Analysis Approach - Interviews for the 94B (Food Service Specialist) were held in the office of the SME, the classroom, and the dining facility. Several SMEs were used due to special knowledge requirements and SME workload. Interviews were held 5-6 hours per day for 5 days per week. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses took place in the classroom and consisted of the initial SME, the verifier, an instructor, and the analyst reviewing the tasks for accuracy and clarification. During the instructor review, the instructor reviewed the knowledges and the steps in the tasks which were not taught.

Problems - No major problems were encountered.

Discrepancies - No major discrepancies were noted.

Soldier's Manual - The Soldier's Manual provided a good guide for major steps to be included in each task.

Equipment - Major equipment is taught hands on, through the use of VIR's, and platform instruction.

Personnel - The 94B personnel were extremely cooperative and helpful. They were readily available to the analyst at all times during the analyses.

Types of Knowledges - To perform tasks successfully, the 94B soldier must possess basic math skills which include fractions, decimals, units of measurement, and reading and interpreting gauges. Additionally, the soldier must possess reading comprehension and reference skills.

MOS SUMMARY - 95B MILITARY POLICE

Analysis Approach - Initial analysis interviews, verification interviews, and instructor reviews were nearly all conducted in the instructional areas or instructor areas for the MOS. Because of the diversity of tasks, many areas and 73 SMEs were used. Analysts not only conducted interviews but upon some occasions attended classes, observed student walk-throughs, and observed students participating in training exercises and hands-on testing.

Problems - Although two earlier analysts on this MOS complained of SME non-availability, the analyst writing this summary encountered no significant problems of this sort. In fact, the most difficult problem (and it was of no real consequence) was finding SMEs for a few somewhat unusual non-proponent tasks, such as "Develop a Squad Loading Plan for Transporting by Air."

Several Skill Level 20 non-proponent tasks seem more appropriate to Skill Level 30 since they are specifically focused at the squad leader level or above.

Six tasks on the 90 MM RCLR (Recoilless Rifle) are included in the task list even though no MP units have had such weapons for nearly 10 years. The only explanation given for this oddity was that the tasks were left in until a replacement weapon is designated.

Discrepancies - None other than those noted above under problems.

Soldier's Manual - Proponent tasks are very well written with the performance steps in most cases explicit and in agreement with information given by SMEs.

Skill Level 20 supervisory tasks tend to reiterate the SL 10 skills which are being supervised. This occasionally results in some seeming confusion of roles, but SMEs are generally quite clear on the proper division of authority and responsibilities.

Tasks do not (in many instances) occur in the manual in the numerical order of their task numbers. This occasionally creates difficulty in locating a particular task, especially since the Soldier's Manuals have no indexes.

Equipment - A common complaint among instructors was that there was not enough equipment, equipment seriously worn by extensive use, and difficulty of getting equipment to teach new tasks in the POI.

95B - 2

Personnel - Generally, excellent. SMEs went out of their way to be helpful and make themselves available. The few times appointments were not kept because of unexpected assignments or forgetfulness were more than adequately compensated later by the same individuals.

Types of Knowledges - Because of the sensitivity of their role in dealing with civilian visitors to military installations as well as with the military community, 95Bs need a high level of human relations skills and knowledges, a fact which is repeatedly emphasized in their training. Also, because they must keep many records, forms, and their MP notebooks, 95Bs need a firm grasp of composition, grammar, spelling, and punctuation skills. They also must be accurate in noting specific times, dates, and factual details - skillfully sorting observable facts from impressions and interpretations. Some math skills are required for relatively simple measurements and computations.

MOS SUMMARY - 95C CORRECTIONAL SPECIALIST

Analysis Approach - 95C and 95B tasks are very closely related, with all the non-proponent tasks that are taught being taught together. Because of that, all 95C non-proponent tasks were treated as replicates of 95B tasks, facilitating bookkeeping. This summary will focus on the 95C proponent tasks.

Only four SMEs were used for this MOS, all of them instructors. All interviews - initial, verification/IR were conducted in the instructional area.

Major Problems - The original analyst for this MOS left rather suddenly without providing input for the MOS summary. The analyst completing the MOS encountered no problems of significance other than the fact that initial interviews had been conducted for all tasks, and that 15 proponent tasks had to be re-interviewed.

Discrepancies - Inclusion of one task in the soldier's manual, Take Record Fingerprint Impressions, which SMEs stated is not done by 95C.

Soldier's Manual - Inclusion of one task in Skill Level 1 manual which is not done by 95C - Take Record Fingerprint Impressions.

Equipment - None

Personnel - Excellent cooperation. SME willingly submitted to being interviewed a second time (See Major Problems) and went through all 15 tasks at one sitting.

Depth/Type of Knowledges - Because the 95C deals with processing and controlling prisoners and civilian visits to prisoners, they need a high level of human relations skills and knowledges. In maintaining accountability of prisoners, equipment, and supplies, forms are often utilized for record-keeping -- requiring accuracy, precision, and the ability to record information.

MOS SUMMARY - 96B INTELLIGENCE ANALYST

The 96B MOS is a purely mental MOS. There is no equipment or items to be handled or manipulated. Most of what a 96B does involves paperwork and filing of reports. The 96B obtains information from all sources and compiles, sorts, analyzes, files, and re-disseminates the information. Because most of the information a 96B handles is intelligence information, he must be familiar with security procedures and the forms and paperwork involved.

A 96B's main job is analyzing information. To do this, skill is needed to separate useful information from the extraneous material and to compile it into a meaningful manner. Areas where information is required to complete a file must be recognized and communicated to a source capable of acquiring that information.

Many times a 96B is called upon to provide intelligence information that has been compiled. Report writing skills are invaluable as well as verbal communication skills up to giving a formal briefing.

Because this MOS requires analysis of information from all sources, knowledge of many areas is helpful. Common sense and logical thought both are quite important.

FIELD SITE SUMMARY REPORT

Ft. Eustis

Prepared by:
Mike Andriunas
Site Supervisor, Ft. Eustis

Operational Period: June 1981-December 1982

Total MOS: 16

RCA Personnel/Analysts: Long Term - 4 (12-18 months)
Short Term - 5 (3-6 months)

RCA Field Office: Excellent location for work activities within the domain of
Army training

Support Equipment: 2 post telephones, 2 business phones, 1 copier, 1 CRT and printer

POC: Brenda Dawson/ Rose Marie Taylor

Summary of Work Effort

Operations

During the period from June 1981 - August 1982, two analysts left and six were assigned to the field site. The average day-to-day operations of analysis consisted of:

Interviews - daily, approximately 7:30 a.m. - 1:00 p.m.
Verification - bi-monthly
Instructor Review - upon completion of verification
Write-Up - daily

Usually the average amount of tasks to be written up from notes were 10-12. In some cases, greater amounts were in note form due to conducting more interviews in advance to anticipate SME rescheduling or non-availability. Interview sessions were conducted at various locations on post in order to avoid overcrowding and disruptions of analysis in the field office.

Weekly meetings occurred between Site Supervisor and POC to discuss current status of each MOS, SME scheduling, and a specific briefing on new developments in the ETAP Format (TPA-1, TPA-2, TPA-3, and KA).

Weekly meetings occurred between Site Supervisor and Analysts to review and discuss current status of individual efforts, SME scheduling, and RCA-BSEP guidelines and procedures.

SME cooperation was very good in most cases. There were periods where the SME was required to perform Instructional duties in addition to support BSEP. This conflict would indicate a frustrated attitude by the SME. The only way to cope with this was to request back-up personnel. In MOS 67Y, several SMEs were needed to support the effort due to SME "burn out" and conflicting instructional duties. Overall, the SMEs strived for quality in our product and prepared themselves well prior to each interview session.

MOS Scheduling, Verification, Time Constraints

The work flow remained continuous and in a routine fashion up to July 1982. The project goal was to complete analysis activities by October 1982. Two major factors restricted the October deadline.

The first factor was the analysis of MOS 61C. This MOS suffered problems with a lengthy task list not anticipated. In addition, there were problems with the task numbers and statements being identical and the availability of SMEs. The analyst had to spend a great deal of time from July to October to finally arrive at a workable task list. The analyst really had to analyze the task list before analysis could get underway. Therefore, from July to October, the analyst was involved in an "on-off" work effort. During any lag time on 61C, the analyst assisted in analyses of 68J and 67T. The 61C analysis was finally completed in early December. Details of 61C can be found in the MOS Summary Report.

The second factor was the change in the verification procedures which occurred in July and in October. A verification committee approach was initiated to review each task of an MOS for technical accuracy, excluding the analyst from participation. Usually, the committee consisted of one SME (DTD), and it appeared to be the original designated verifier from the start of the project. The committee approach to verification was beneficial to both RCA and the Army because it gave the Army an opportunity to perform a final review and make changes by which the analyst was available to send RCA with a finalized product. From the start, the committee made relatively slow progress during the first month. However, their work effort did increase towards the beginning of November.

Some of the problems with the committee involved the verifiers assigned to the project, which included:

- Some verifiers were not properly briefed by the POC concerning the analysis effort, format and objectives.
- Some verifiers tend to only attach a copy of a DTD analysis (major steps) which did not indicate if the task reviewed was acceptable or if changes were needed.
- Verifiers were not always provided with the TRADOC Review forms, therefore verification results were returned on various types of loose paper.
- Some verifiers were not informed as to how cross-referencing worked in the ETAP and its use in analysis.

- Overall, verification was not consistent and it became necessary for the analyst to brief committee members on verification needs and procedures in order to have a workable product.
- Some verifiers did not have any field experience and had to rely upon the Technical Manual to review the task.

In late October and early November, a second committee process was included in the overall verification process. This committee was composed of BSEP Civilian staff. Their function was to review each task prior to submittal to the Verification (SME) Committee. The BSEP civilian would review the ETAP for format, detail and level of specificity. This aspect of verification was again beneficial to the Army and RCA because it was an aspect of a final review of the MOS. Again, similar problems developed as indicated in the Verification Committee, which were consistency and understanding of how the ETAP was written.

In summary of the Committee's involvement (both Civilian and SME), time was lost due to the lack of a uniform briefing by the POC to all staff involved. The RCA staff found themselves answering questions about format for review rather than task content. It appeared that some of the BSEP staff were unsure of their duties and responsibilities. It became necessary for RCA staff to meet frequently to discuss how they should approach their work effort which should have been defined by the POC.

Two MOS suffered criticism for ETAP format, detail, and level of specificity. This required a rewrite and re-analysis of 77 tasks in 57H and 32 tasks in 67T for final approval.

Equipment - CRT and Printer

The CRT and printer proved to be a valuable time-saving tool to transfer analysis notes to a final printed ETAP. Two analysts utilized the equipment daily and probably cut the write-up time by 50% or more. Using the CRT, the analyst was able to edit the analysis and insert changes or additions to the ETAP quickly. This allowed the analyst to work on fresh analysis continually and submit the task to verifiers on a timely fashion.

Staff Training/Supervision

Staff training at the field site for new analyst involved similar activities used by the Home Office such as role-playing and practical sessions for writing ETAPs. All analysts were provided with a check-off list for pre-analysis planning, including specific questions to ask the SME during the first interview session. Throughout the analysis effort, staff would informally assist each in areas of writing style, level of detail, use of job aids, knowledge analysis and to share experiences concerning interviewing techniques.

All analysts were required to leave a written schedule of work activities planned on a daily basis which included times, location of interviews, and phone numbers.

Discussion of individual projects occurred to identify current progress and quality of work effort and uniformity of style.

In many cases, informal group sessions were used to clarify ETAP procedures and knowledge analysis.

Each analyst submitted projected (2 week advanced) schedules of tasks to be analyzed which was used as a guide to follow the analysis as well as a projected plan sent to the Home Office via the computer.

An MOS wall chart was utilized to monitor the total work effort. The chart was divided by specific categories of individual MOS status which included tasks interviewed, tasks written up, tasks in verification, tasks deleted, tasks sent to HQ, and tasks remaining. The analyst would update their MOS on a daily basis in order to have an accurate account of each individual MOS activity.

ATTACHMENT O

Taxonomy Summaries

Notes:

1. A check (✓) in the "NT" column means the prerequisite competency is not taught in AIT.
2. A check (✓) in the second column means the prerequisite competency was identified as part of the analysis.
3. Not all MOS are represented because some analysts were unavailable to complete summary taxonomies.

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select limit(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

13 SOLIDS

1. ☐ a. Recognize and match the names of solids with their corresponding figures

14 FRACTIONS/DECIMALS

1. ☐ a. Add or subtract fractions with like and unlike denominators
2. ☐ b. Convert fractions to decimal equivalents and vice versa

15 MEASUREMENT

1. ☐ a. Measure length, mass, volume, temperature, and time
2. ☐ b. Convert units of measurement
3. ☐ c. Estimate length, mass, volume, temperature, and time
4. ☐ d. Add or subtract positive and negative (+) numbers, using a number line to show the solution
5. ☐ e. Add or subtract to find exact time (24 hr clock) using hours or minutes
6. ☐ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
7. ☐ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
8. ☐ h. Estimate a sum or difference

16 MULTIPLICATION AND DIVISION

1. ☐ a. Multiply and divide whole numbers
2. ☐ b. Multiply and divide mixed numbers (whole and decimals)
3. ☐ c. Divide a number with decimals in both divisor and dividend
4. ☐ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
5. ☐ e. Estimate a product or quotient

17 FRACTIONS/DECIMALS

1. ☐ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
2. ☐ b. Reduce fractions to lowest terms
3. ☐ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
4. ☐ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
5. ☐ e. Add and subtract fractions, with same or different denominators
6. ☐ f. Multiply and divide fractions with and without whole numbers
7. ☐ g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

1. ☐ a. Draw geometric figures: plane and solid
2. ☐ b. Match geometric figures with word names: equivalent measures
3. ☐ c. Label all parts of geometric figures using mathematical and common language designators
4. ☐ d. Use a protractor to measure angles; make geometrical construction
5. ☐ e. Construct perpendicular on a line segment; bisector of an angle
6. ☐ f. Compute the perimeter and area of any figure
7. ☐ g. Compute the circumference and area of a circle
8. ☐ h. Compute the area and volume of any solid figure
9. ☐ i. Use formulas in solving problems involving geometric figures
10. ☐ j. Solve problems and interpret spatial relationships of figures: synthesis and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

1. ☐ a. Identify median and mode
2. ☐ b. Compute averages
3. ☐ c. Solve problems combining all processes using whole, mixed numbers and fractions
4. ☐ d. Solve problems, combining all processes, involving units of measurement
5. ☐ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
6. ☐ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}\text{F}$ or $^{\circ}\text{C}$) measures
7. ☐ g. Solve problems involving ratio and proportion
8. ☐ h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

1. ☐ a. Identify coordinates of a point in any grid system
2. ☐ b. Identify points on a line graph
3. ☐ c. Match a graph with its equation

18 ALGEBRA

1. ☐ a. Solve simple algebraic equations with one unknown
2. ☐ b. Recognize and derive equivalent algebraic expressions
3. ☐ c. Evaluate powers and estimate roots

19 TRIGONOMETRY

1. ☐ a. Use tables of trigonometric functions
2. ☐ b. Use tables of logarithms to solve problems
3. ☐ c. Solve geometric problems using trigonometric functions
4. ☐ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

26 PROCEDURAL DIRECTIONS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify factual details or specifications that are found within a statement or written selection |
| <input checked="" type="checkbox"/> | b | Select parts of text and visual material to complete a task activity |
| <input checked="" type="checkbox"/> | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d | Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e | Identify from a written source which does not explicitly provide required information in order to make a decision |
| <input checked="" type="checkbox"/> | f | Synthesize information from written sources which contributes to the completion of a task activity |

26 VOCABULARY

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b | Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c | Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e | Determine the meaning of figurative, idiomatic and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27 REFERENCE SKILLS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| <input checked="" type="checkbox"/> | b | Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c | Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d | Locate the page, line, paragraph, figure, or chart needed to answer question or to solve a problem |
| <input checked="" type="checkbox"/> | e | Determine after scanning or skimming reading, whether the information is relevant |
| <input checked="" type="checkbox"/> | f | Cross reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g | Organize information from multiple sources into a sequenced series of events |

28 TABLES/CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Obtain a fact or specification from a two column table or chart to find information |
| <input checked="" type="checkbox"/> | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c | Interpret a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| <input checked="" type="checkbox"/> | d | Apply information from tables and charts for locating malfunctions or for determining mode of action |

VISUAL AIDS

NT

29 ILLUSTRATIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration in picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f | Integrate information from various sources to select a course of action |

30 FLOW CHARTS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b | Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| <input checked="" type="checkbox"/> | c | Translate the significance of the symbols into physical activities |

31 SCHEMATICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Isolate each major section or entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b | Identify the components within each entity |
| <input checked="" type="checkbox"/> | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32 FORMS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and non-enclature, in appropriate sections of the form |
| <input checked="" type="checkbox"/> | d | Write a descriptive account of an activity or transaction performed |
| <input checked="" type="checkbox"/> | e | Use a completed form to locate or compare information |

33 NOTE-TAKING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between essential and non-essential details during the note taking process |
| <input checked="" type="checkbox"/> | b | Record details without misinterpreting the intent of either written material or an interview |
| <input checked="" type="checkbox"/> | c | Rewrite all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d | Organize all sentences into paragraphs |

AD-A143 593

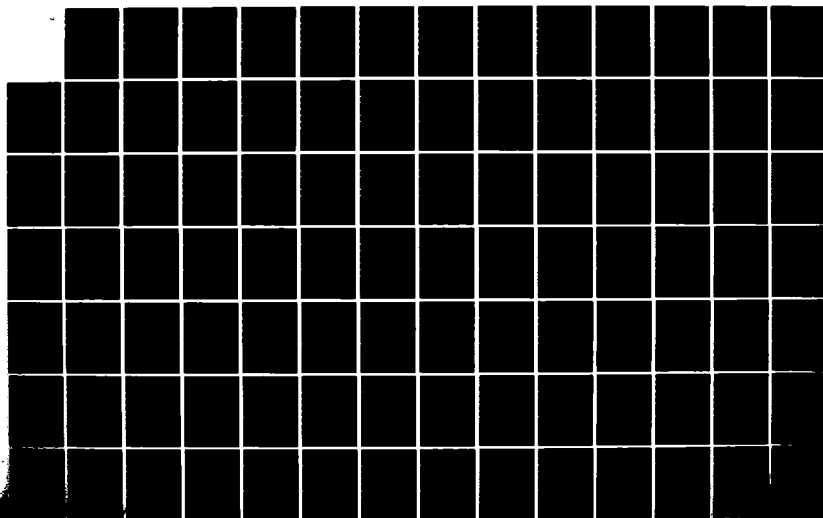
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT68-81-C-0017

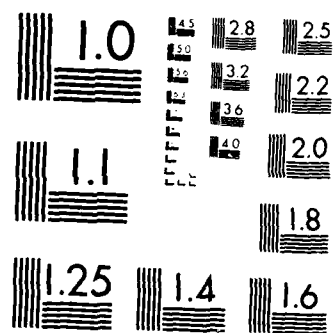
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NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

NT

34 OUTLINING (topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

38 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

- | | | |
|---|---|---|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing - communicating final instructions to others or giving an account in summary |
| ✓ | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
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| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step-by-step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal commands are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and inter-personal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through 9 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric systems |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24-hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10 SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18 ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19 TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

26 PROCELRAL DIRECTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify factual details or specifications that are found within a statement or written selection |
| <input checked="" type="checkbox"/> | b | Select parts of text and visual materials to complete a task activity |
| <input checked="" type="checkbox"/> | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d | Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e | Inter from a written source, which does not explicitly provide required information, in order to make a decision |
| <input checked="" type="checkbox"/> | f | Synthesize information from written sources which contributes to the completion of a task activity |

26 VOCABULARY

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b | Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c | Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27 REFERENCE SKILLS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| <input checked="" type="checkbox"/> | b | Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c | Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| <input checked="" type="checkbox"/> | e | Determine, after scanning or skim-reading, whether the information is relevant |
| <input checked="" type="checkbox"/> | f | Cross reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g | Organize information from multiple sources into a sequenced series of events |

28 TABLES/CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Obtain a fact or specification from a two column table or chart to find information |
| <input checked="" type="checkbox"/> | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c | Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| <input checked="" type="checkbox"/> | d | Apply information from tables and charts for locating malfunctions, or for selecting a course of action |

VISUAL AIDS

NT

29 ILLUSTRATIONS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f | Integrate information from various sources to select a course of action |

30 FLOW CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving |
| <input checked="" type="checkbox"/> | c | Translate the significance of the symbols into physical activities |

31 SCHEMATICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Isolate each major section or entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b | Identify the components within each entity |
| <input checked="" type="checkbox"/> | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32 FORMS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate section of the form |
| <input checked="" type="checkbox"/> | d | Write a descriptive account of an activity or transaction performed |
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- | | | |
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| <input checked="" type="checkbox"/> | a | Distinguish between essential and non-essential details during the note taking process |
| <input checked="" type="checkbox"/> | b | Record details without misinterpreting the intent of either written material or an interview |
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NT

34. OUTLINING (topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
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35. REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
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4/23/82

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|---|---|---|
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NUMERATION/PLACE VALUE

NT

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- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
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- | | |
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- | | |
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| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
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| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

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|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
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| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ___ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ___ a. Identify technical words associated with geometric figures
___ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ___ a. Add or subtract whole numbers, without carrying or borrowing
___ b. Add or subtract whole numbers, carrying and borrowing
___ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
___ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
___ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
___ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
___ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
___ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ___ a. Multiply and divide whole numbers
___ b. Multiply and divide mixed numbers (whole and decimals)
___ c. Divide a number with decimals in both divisor and dividend
___ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
___ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ___ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
___ b. Reduce fractions to lowest terms
___ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
___ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
___ e. Add and subtract fractions, with same or different denominators
___ f. Multiply and divide fractions with and without whole numbers
___ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ___ a. Draw geometric figures, plane and solid
___ b. Match geometric figures with word names, equivalent measures
___ c. Label all parts of geometric figures using mathematical and characteristic designators
___ d. Use a protractor to measure angles, make geometrical constructions
___ e. Construct perpendicular on a line segment, bisector of an angle
___ f. Compute the perimeter and area of any figure
___ g. Compute the circumference and area of a circle
___ h. Compute the area and volume of any solid figure
___ i. Use formulas in solving problems involving geometric figures
___ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ___ a. Identify median and mode
___ b. Compute averages
___ c. Solve problems combining all processes using whole, mixed numbers and fractions
___ d. Solve problems, combining all processes, involving units of measurement
___ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
___ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
___ g. Solve problems involving ratio and proportion
___ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ___ a. Identify coordinates of a point in any grid system
___ b. Identify points on a line graph
___ c. Match a graph with its equation

18. ALGEBRA

- ___ a. Solve simple algebraic equations with one unknown
___ b. Recognize and derive equivalent algebraic expressions
___ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ___ a. Use tables of trigonometric functions
___ b. Use tables of logarithms to solve problems
___ c. Solve geometric problems using trigonometric functions
___ d. Use trigonometric ratios to solve problems

4/27/82

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input type="checkbox"/>	a. Identify factual details or specifications that are found within a statement or written selection
<input type="checkbox"/>	b. Select parts of text and visual materials to complete a task activity
<input type="checkbox"/>	c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input type="checkbox"/>	d. Determine the essential message of a paragraph or section of written material
<input type="checkbox"/>	e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input type="checkbox"/>	f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input type="checkbox"/>	a. Recognize common words and their meanings
<input type="checkbox"/>	b. Recognize task related words with technical meanings
<input type="checkbox"/>	c. Identify the correct meaning of a word from the context of a sentence
<input type="checkbox"/>	d. Recognize the meaning of common contractions, abbreviations and acronyms
<input type="checkbox"/>	e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input type="checkbox"/>	a. Locate a Technical Manual, Field Manual or any related source document by code number and title
<input type="checkbox"/>	b. Alphabetize words or topics to locate information
<input type="checkbox"/>	c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
<input type="checkbox"/>	d. Locate the page, title, paragraph, figure, or chart needed to answer a question - to solve a problem
<input type="checkbox"/>	e. Determine, after scanning or skim reading, whether the information is relevant
<input type="checkbox"/>	f. Cross reference within and across source documents to select information needed to perform a routine
<input type="checkbox"/>	g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input type="checkbox"/>	a. Obtain a fact or specification from a two column table or chart to find information
<input type="checkbox"/>	b. Obtain a fact or specification from an intersection of a row by column table or chart
<input type="checkbox"/>	c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input type="checkbox"/>	d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

<input type="checkbox"/>	a. Identify details, labels, numbers, and parts from an illustration or picture
<input type="checkbox"/>	b. Identify parts or details according to a key or legend
<input type="checkbox"/>	c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input type="checkbox"/>	d. Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system
<input type="checkbox"/>	e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input type="checkbox"/>	f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input type="checkbox"/>	a. Use a simple linear path of an organizational chart to list events in sequential order
<input type="checkbox"/>	b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input type="checkbox"/>	c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input type="checkbox"/>	a. Isolate and major section or entity presented in a schematic diagram
<input type="checkbox"/>	b. Identify the components within each entity
<input type="checkbox"/>	c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input type="checkbox"/>	d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input type="checkbox"/>	e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input type="checkbox"/>	a. Locate the block on a form to enter the appropriate information
<input type="checkbox"/>	b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input type="checkbox"/>	c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input type="checkbox"/>	d. Write a descriptive account of an activity or transaction performed
<input type="checkbox"/>	e. Use a completed form to locate or compare information

33. NOTE TAKING

<input type="checkbox"/>	a. Distinguish between essential and non essential details during the note taking process
<input type="checkbox"/>	b. Record details without misinterpreting the intent of either written material or an interview
<input type="checkbox"/>	c. Rewrite all recorded details in sentence form
<input type="checkbox"/>	d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| | a | State the intent or objective(s) of the report |
| | b | Describe the parameters of the event or situation |
| | c | Distinguish between relevant and irrelevant details |
| | d | Sequence events in the order they have occurred |
| | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task-related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|---|---|--|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview - person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| | f | Briefing - communicating final instructions to others or giving an account in summary |
| ✓ | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| | b | Use technical vocabulary suitable to the task and level of the person |
| | c | Determine the appropriate amount of information to communicate |
| | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step-by-step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low-key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal commands are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and inter personal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|--|---|--|
| | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| | b | Use body language (motions, gestures, postures) to communicate or signal |
| | c | Determine the presence of a defect or extent of damage |
| | d | Match objects by size, shape, color and significant markings |
| | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sound, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through 10 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) denotation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify relations that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compare the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCESSIONAL DIRECTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify factual details or specifications that are found within a statement or written selection |
| <input checked="" type="checkbox"/> | b | Select parts of text and visual materials to complete a task activity |
| <input checked="" type="checkbox"/> | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d | Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e | Infer from a written source which does not explicitly provide required information in order to make a decision |
| <input checked="" type="checkbox"/> | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b | Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c | Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate a Technical Manual, Field Manual or any related source (document, code number and title) |
| <input checked="" type="checkbox"/> | b | Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c | Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| <input checked="" type="checkbox"/> | e | Determine, after scanning or skimming, whether the information is relevant |
| <input checked="" type="checkbox"/> | f | Cross reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Obtain a fact or specification from a two column table or chart to find information |
| <input checked="" type="checkbox"/> | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c | Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| <input checked="" type="checkbox"/> | d | Apply information from tables and charts for locating malfunction, or for planning a course of action |

VISUAL AIDS

NT

29. ILLUSTRATIONS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f | Integrate information from various sources to select a course of action |

30. FLOW CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b | Use a linear path in a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| <input checked="" type="checkbox"/> | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Isolate each major section of entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b | Identify the components within each entity |
| <input checked="" type="checkbox"/> | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b | Transfer a number, code, date, figure or related data from equipment to written sources onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c | Write the name of the organization, responsible personnel, display name of the part or equipment, and nomenclature, in appropriate sections of a form |
| <input checked="" type="checkbox"/> | d | Write a descriptive account of an activity or transaction performed |
| <input checked="" type="checkbox"/> | e | Use a completed form to locate or compare information |

33. NOTE TAKING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Distinguish between essential and extraneous highlights during the study of a process |
| <input checked="" type="checkbox"/> | b | Record details without substitute phrasing for intent of either written or verbal interview |
| <input checked="" type="checkbox"/> | c | Rewrite all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d | Organize all sentences into paragraphs |

NT

34 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

h. Interpret Codes & Symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through 9 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24-hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim-reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34	OUTLINING (topic or sentence)
✓	a. Distinguish between major and subordinate topics
✓	b. Generate titles for each major topic selected
✓	c. Use phrases or sentences to provide subordinate details under each major topic
✓	d. Alternate, indent numbers and letters to establish a hierarchy

35	REPORT WRITING
✓	a. State the intent or objective(s) of the report
✓	b. Describe the parameters of the event or situation
✓	c. Distinguish between relevant and irrelevant details
✓	d. Sequence events in the order they have occurred
✓	e. State general impressions of events described
✓	f. Select examples that will clarify major issues presented in the report
✓	g. Examine opposing points of view in the report
✓	h. Summarize the major points developed in the report
✓	i. Justify an action taken and give reasons for rejecting alternatives

36	EDITING
✓	a. Spell frequently used words correctly
✓	b. Spell task-related words correctly
✓	c. Identify words that need to be capitalized
✓	d. Correct all misspelled words with or without the use of a reference source
✓	e. Apply all rules for end marks, commas, and apostrophes
✓	f. Apply common rules of grammar
✓	g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
✓	h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37	TYPE
✓	a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
✓	b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
✓	c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
✓	d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
✓	e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
✓	f. Briefing - communicating final instructions to others or giving an account in summary
✓	g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
✓	h. Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38	CHARACTERISTICS
✓	a. Enunciate clearly, using the proper rate of speech
✓	b. Use technical vocabulary suitable to the task and level of the person
✓	c. Determine the appropriate amount of information to communicate
✓	d. Interpret figurative or idiomatic language by reference to its use in context
✓	e. Follow highly detailed, step-by-step directions
✓	f. Solicit feedback to confirm the accurate reception of the communication
✓	g. Recognize when a low key, informal dialogue is suitable
✓	h. Recognize when direct verbal commands are necessary
✓	i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
✓	j. Recognize when the situation will require a structured, preplanned method of presentation

39	BARRIERS
✓	a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
✓	b. Recognize personality factors and inter-personal relationships that may exist
✓	c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40	PRECAUTIONS
✓	a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
✓	b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
✓	c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41	RECOGNITION
✓	a. Identify similarities and differences between and among objects
✓	b. Use body language (motions, gestures, postures) to communicate or signal
✓	c. Determine the presence of a defect or extent of damage
✓	d. Match objects by size, shape, color and significant markings
✓	e. Classify objects by size, shape, color and significant markings
✓	f. Determine direction, duration, and intensity of sounds, sightings and smells
✓	g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
✓	h. Interpret Codes & Symbols

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>11</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pint, quart, gallon, liter |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3 DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4 TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5 GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) denunciation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7 LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8 PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9 ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written, material, or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

14. OUTLINING (topic or sentence)

<input checked="" type="checkbox"/>	a	Distinguish between major and subordinate topics
<input checked="" type="checkbox"/>	b	Generate titles for each major topic selected
<input checked="" type="checkbox"/>	c	Use phrases or sentences to provide subordinate details under each major topic
<input checked="" type="checkbox"/>	d	Alternate indent numbers and letters to establish a hierarchy

15. REPORT WRITING

<input checked="" type="checkbox"/>	a	State the intent or objective(s) of the report
<input checked="" type="checkbox"/>	b	Describe the parameters of the event or situation
<input checked="" type="checkbox"/>	c	Distinguish between relevant and irrelevant details
<input checked="" type="checkbox"/>	d	Sequence events in the order they have occurred
<input checked="" type="checkbox"/>	e	State general impressions of events described
<input checked="" type="checkbox"/>	f	Select examples that will clarify major issues presented in the report
<input checked="" type="checkbox"/>	g	Examine opposing points of view in the report
<input checked="" type="checkbox"/>	h	Summarize the major points developed in the report
<input checked="" type="checkbox"/>	i	Justify an action taken and give reasons for rejecting alternatives

16. EDITING

<input checked="" type="checkbox"/>	a	Spell frequently used words correctly
<input checked="" type="checkbox"/>	b	Spell task related words correctly
<input checked="" type="checkbox"/>	c	Identify words that need to be capitalized
<input checked="" type="checkbox"/>	d	Correct all misspelled words with or without the use of a reference source
<input checked="" type="checkbox"/>	e	Apply all rules for end marks, commas, and apostrophes
<input checked="" type="checkbox"/>	f	Apply common rules of grammar
<input checked="" type="checkbox"/>	g	Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
<input checked="" type="checkbox"/>	h	Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

<input checked="" type="checkbox"/>	a	Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
<input checked="" type="checkbox"/>	b	Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
<input checked="" type="checkbox"/>	c	Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
<input checked="" type="checkbox"/>	d	Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
<input checked="" type="checkbox"/>	e	Interview - a person communicating with another about his activities, opinions, or subject specialties for the purpose of using the information in a task
<input checked="" type="checkbox"/>	f	Briefing - communicating final instructions to others or giving an account in summary
<input checked="" type="checkbox"/>	g	Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
<input checked="" type="checkbox"/>	h	Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

<input checked="" type="checkbox"/>	a	Enunciate clearly, using the proper rate of speech
<input checked="" type="checkbox"/>	b	Use technical vocabulary suitable to the task and level of the person
<input checked="" type="checkbox"/>	c	Determine the appropriate amount of information to communicate
<input checked="" type="checkbox"/>	d	Interpret figurative or idiomatic language by reference to its use in context
<input checked="" type="checkbox"/>	e	Follow highly detailed, step by step directions
<input checked="" type="checkbox"/>	f	Solicit feedback to confirm the accurate reception of the communication
<input checked="" type="checkbox"/>	g	Recognize when a flow key, informal dialogue is suitable
<input checked="" type="checkbox"/>	h	Recognize when direct verbal commands are necessary
<input checked="" type="checkbox"/>	i	Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
<input checked="" type="checkbox"/>	j	Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

<input checked="" type="checkbox"/>	a	Recognize the need for clear, concise directions in order to avoid language or word meaning differences
<input checked="" type="checkbox"/>	b	Recognize personality factors and inter personal relationships that may exist
<input checked="" type="checkbox"/>	c	Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

<input checked="" type="checkbox"/>	a	Use common knowledge to avoid hazards in order to prevent injury to self or equipment
<input checked="" type="checkbox"/>	b	Apply preventive measures prior to task performance to minimize any potential safety or security problem
<input checked="" type="checkbox"/>	c	Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

<input checked="" type="checkbox"/>	a	Identify similarities and differences between and among objects
<input checked="" type="checkbox"/>	b	Use body language (motions, gestures, postures) to communicate or signal
<input checked="" type="checkbox"/>	c	Determine the presence of a defect or extent of damage
<input checked="" type="checkbox"/>	d	Match objects by size, shape, color and significant markings
<input checked="" type="checkbox"/>	e	Classify objects by size, shape, color and significant markings
<input checked="" type="checkbox"/>	f	Determine direction, duration, and intensity of sounds, sightings and smells
<input checked="" type="checkbox"/>	g	Infer from sights, sounds, touch, smells, or tastes to determine a course of action
<input checked="" type="checkbox"/>	h	Interpret Codes & Symbols

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 10 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounces, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an inter section of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others in order or action to be taken where a person has a position of authority |

NT

38. CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smell, or tastes to determine a course of action |
| <input checked="" type="checkbox"/> | h | Interpret Codes & Symbols |

4/23/82

NUMERATION/PLACE VALUE

NT

1. NUMBERRING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, tens, fives, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with the corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25 PROCDUAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two-column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29 ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30 FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31 SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33 NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
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NT

34. OUTLINING (topic or sentence)

- ☒ a Distinguish between major and subordinate topics
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35. REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
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36. EDITING

- ☒ a Spell frequently used words correctly
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- ☒ f Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

4/23/82

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
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| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
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UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
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| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
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- | | | |
|-------------------------------------|---|--|
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| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
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- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
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NT

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- | | | |
|-------------------------------------|---|---|
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| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

110. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25 PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine after scanning or skim-reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29 ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30 FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31 SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33 NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate titles for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step by step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and inter personal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/lessor from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing <i>hour and distance</i> |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read-out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select bend(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCD DURAL DIRECTION

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for synthesizing a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

NT

38. CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

4/23/82

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING:

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and nickels |
| <input checked="" type="checkbox"/> | b | Write numerals one through N in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mill as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Estimate calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select bands from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

110. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

114. FRACTIONS/DECIMAL

- ☒ a Subdivide whole units or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisect an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

118. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCESSIONAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (Topic or Sentence)

- a. ☒ Distinguish between major and subordinate topics
- b. ☒ Generate titles for each major topic selected
- c. ☒ Use phrases or sentences to provide subordinate details under each major topic
- d. ☒ Alternate indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. ☒ State the intent or objective(s) of the report
- b. ☒ Describe the parameters of the event or situation
- c. ☒ Distinguish between relevant and irrelevant details
- d. ☒ Sequence events in the order they have occurred
- e. ☒ State general impressions of events described
- f. ☒ Select examples that will clarify major issues presented in the report
- g. ☒ Examine opposing points of view in the report
- h. ☒ Summarize the major points developed in the report
- i. ☒ Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. ☒ Spell frequently used words correctly
- b. ☒ Spell task related words correctly
- c. ☒ Identify words that need to be capitalized
- d. ☒ Correct all misspelled words with or without the use of a reference source
- e. ☒ Apply all rules for end marks, commas, and apostrophes
- f. ☒ Apply common rules of grammar
- g. ☒ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. ☒ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. ☒ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. ☒ Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. ☒ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. ☒ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. ☒ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. ☒ Briefing - communicating final instructions to others or giving an account in summary
- g. ☒ Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. ☒ Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- a. ☒ Enunciate clearly, using the proper rate of speech
- b. ☒ Use technical vocabulary suitable to the task and level of the person
- c. ☒ Determine the appropriate amount of information to communicate
- d. ☒ Interpret figurative or idiomatic language by reference to its use in context
- e. ☒ Follow highly detailed, step by step directions
- f. ☒ Solicit feedback to confirm the accurate reception of the communication
- g. ☒ Recognize when a low key, informal dialogue is suitable
- h. ☒ Recognize when direct verbal commands are necessary
- i. ☒ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. ☒ Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. ☒ Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. ☒ Recognize personality factors and inter personal relationships that may exist
- c. ☒ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. ☒ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. ☒ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. ☒ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. ☒ Identify similarities and differences between and among objects
- b. ☒ Use body language (motions, gestures, postures) to communicate or signal
- c. ☒ Determine the presence of a defect or extent of damage
- d. ☒ Match objects by size, shape, color and significant markings
- e. ☒ Classify objects by size, shape, color and significant markings
- f. ☒ Determine direction, duration, and intensity of sounds, sightings and smells
- g. ☒ Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through N in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Recognize the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing time and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

110. SOLIDS

- ✓ ☐ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ✓ ☐ a. Identify technical words associated with geometric figures
 ✓ ☐ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ✓ ☐ a. Add or subtract whole numbers, without carrying or borrowing
 ✓ ☐ b. Add or subtract whole numbers, carrying and borrowing
 ✓ ☐ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
 ✓ ☐ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
 ✓ ☐ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
 ✓ ☐ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
 ✓ ☐ g. Add or subtract time, linear, drv., liquid or degree measures requiring regrouping
 ✓ ☐ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ✓ ☐ a. Multiply and divide whole numbers
 ✓ ☐ b. Multiply and divide mixed numbers (whole and decimals)
 ✓ ☐ c. Divide a number with decimals in both divisor and dividend
 ✓ ☐ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
 ✓ ☐ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ✓ ☐ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
 ✓ ☐ b. Reduce fractions to lowest terms
 ✓ ☐ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
 ✓ ☐ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
 ✓ ☐ e. Add and subtract fractions, with same or different denominators
 ✓ ☐ f. Multiply and divide fractions with and without whole numbers
 ✓ ☐ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ✓ ☐ a. Draw geometric figures, plane and solid
 ✓ ☐ b. Match geometric figures with word names, equivalent measures
 ✓ ☐ c. Label all parts of geometric figures using mathematical and characteristic designators
 ✓ ☐ d. Use a protractor to measure angles, make geometrical constructions
 ✓ ☐ e. Construct perpendicular on a line segment, bisector of an angle
 ✓ ☐ f. Compute the perimeter and area of any figure
 ✓ ☐ g. Compute the circumference and area of a circle
 ✓ ☐ h. Compute the area and volume of any solid figure
 ✓ ☐ i. Use formulas in solving problems involving geometric figures
 ✓ ☐ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ✓ ☐ a. Identify median and mode
 ✓ ☐ b. Compute averages
 ✓ ☐ c. Solve problems combining all processes using whole, mixed numbers and fractions
 ✓ ☐ d. Solve problems, combining all processes, involving units of measurement
 ✓ ☐ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
 ✓ ☐ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
 ✓ ☐ g. Solve problems involving ratio and proportion
 ✓ ☐ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ✓ ☐ a. Identify coordinates of a point in any grid system
 ✓ ☐ b. Identify points on a line graph
 ✓ ☐ c. Match a graph with its equation

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- ✓ ☐ a. Solve simple algebraic equations with one unknown
 ✓ ☐ b. Recognize and derive equivalent algebraic expressions
 ✓ ☐ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ✓ ☐ a. Use tables of trigonometric functions
 ✓ ☐ b. Use tables of logarithms to solve problems
 ✓ ☐ c. Solve geometric problems using trigonometric functions
 ✓ ☐ d. Use trigonometric ratios to solve problems

NT

14	OUTLINING (topic or sentence)
a	Distinguish between major and subordinate topics
b	Generate titles for each major topic selected
c	Use phrases or sentences to provide subordinate details under each major topic
d	Alternate indent numbers and letters to establish a hierarchy

35	REPORT WRITING
a	State the intent or objective(s) of the report
b	Describe the parameters of the event or situation
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g	Examine opposing points of view in the report
h	Summarize the major points developed in the report
i	Justify an action taken and give reasons for rejecting alternatives

36	EDITING
a	Spell frequently used words correctly
b	Spell task related words correctly
c	Identify words that need to be capitalized
d	Correct all misspelled words with or without the use of a reference source
e	Apply all rules for end marks, commas, and apostrophes
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g	Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
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VERBAL COMMUNICATION

37	TYPE
a	Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
b	Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
c	Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
d	Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
e	Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
f	Briefing - communicating final instructions to others or giving an account in summary
g	Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
h	Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38	CHARACTERISTICS
a	Formulate clearly, using the proper rate of speech
b	Use technical vocabulary suitable to the task and level of the person
c	Determine the appropriate amount of information to communicate
d	Interpret figurative or idiomatic language by reference to its use in context
e	Follow highly detailed, step by step directions
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a	Recognize the need for clear, concise directions in order to avoid language or word meaning differences
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40	PRECAUTIONS
a	Use common knowledge to avoid hazards in order to prevent injury to self or equipment
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PERCEPTUAL

41	RECOGNITION
a	Identify similarities and differences between and among objects
b	Use body language (motions, gestures, postures) to communicate or signal
c	Determine the presence of a defect or extent of damage
d	Match objects by size, shape, color and significant markings
e	Classify objects by size, shape, color and significant markings
f	Determine direction, duration, and intensity of sounds, sightings and smells
g	Infer from sights, sounds, touch, smells, or tastes to determine a course of action

CONTENT READING

VISUAL AIDS

NT

25 PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Inter from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
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- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29 ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30 FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31 SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

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- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

4/23/82

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounces, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mill as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add or subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEDURAL DIRECTIONS

	a	Identify factual details or specifications that are found within a statement or written selection
	b	Select parts of text and visual materials to complete a task activity
	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
	d	Determine the essential message of a paragraph or section of written material
	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

	a	Recognize common words and their meanings
	b	Recognize task related words with technical meanings
	c	Identify the correct meaning of a word from the context of a sentence
	d	Recognize the meaning of common contractions, abbreviations and acronyms
	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
	b	Alphabetize words or topics to locate information
	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
	e	Determine, after scanning or skimming, whether the information is relevant
	f	Cross reference within and across source documents to select information needed to perform a routine
	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

	a	Obtain a fact or specification from a two column table or chart to find information
	b	Obtain a fact or specification from an intersection of a row by column table or chart
	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29. ILLUSTRATIONS

	a	Identify details, labels, numbers, and parts from an illustration or picture
	b	Identify parts or details according to a key or legend
	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
	e	Follow illustrations, or photographs, arranged in a sequential order as a guide
	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

	a	Use a simple linear path of an organizational chart to list events in sequential order
	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

	a	Isolate each major section or entity presented in a schematic diagram
	b	Identify the components within each entity
	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

	a	Locate the block on a form to enter the appropriate information
	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
	d	Write a descriptive account of an activity or transaction performed
	e	Use a completed form to locate or compare information

33. NOTE TAKING

	a	Distinguish between essential and non-essential details during the note taking process
	b	Record details without misinterpreting the intent of either written material or an interview
	c	Rewrite all recorded details in sentence form
	d	Organize all sentences into paragraphs

NT

34 OUTLINING (Topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate ideas for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4 TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select bands from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8 PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles and the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
- ☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
- ☒ b Add or subtract whole numbers, carrying and borrowing
- ☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- ☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- ☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- ☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
- ☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- ☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
- ☒ b Multiply and divide mixed numbers (whole and decimals)
- ☒ c Divide a number with decimals in both divisor and dividend
- ☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- ☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- ☒ b Reduce fractions to lowest terms
- ☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- ☒ d Compute equivalent value of fractions (decimals, percents, and mixed numbers to lowest terms)
- ☒ e Add and subtract fractions with same or different denominators
- ☒ f Multiply and divide fractions with and without whole numbers
- ☒ g Estimate a fraction, decimal, product or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
- ☒ b Match geometric figures with word names, equivalent measures
- ☒ c Label all parts of geometric figures using mathematical and characteristic designators
- ☒ d Use a protractor to measure angles, make geometrical constructions
- ☒ e Construct perpendicular on a line segment, bisector of an angle
- ☒ f Compute the perimeter and area of any figure
- ☒ g Compute the circumference and area of a circle
- ☒ h Compute the area and volume of any solid figure
- ☒ i Use formulas in solving problems involving geometric figures
- ☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
- ☒ b Compute averages
- ☒ c Solve problems combining all processes using whole, mixed numbers and fractions
- ☒ d Solve problems, combining all processes, involving units of measurement
- ☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- ☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- ☒ g Solve problems involving ratio and proportion
- ☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
- ☒ b Identify points on a line graph
- ☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
- ☒ b Recognize and derive equivalent algebraic expressions
- ☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
- ☒ b Use tables of logarithms to solve problems
- ☒ c Solve geometric problems using trigonometric functions
- ☒ d Use trigonometric ratios to solve problems

BSEP I

CONTENT READING

NT

25. PROCEEDURAL DIRECTIONS

✓	a	Identify factual details or specifications that are found within a statement or written series from
✓	b	Solve parts of text and visual materials to complete a task activity
✓	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
✓	d	Determine the essential message of a paragraph or section of written material
✓	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
✓	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

✓	a	Recognize common words and their meanings
✓	b	Recognize task related words with technical meanings
✓	c	Identify the correct meaning of a word from the context of a sentence
✓	d	Recognize the meaning of common contractions, abbreviations and acronyms
✓	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

✓	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
✓	b	Alphabetize words or topics to locate information
✓	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
✓	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
✓	e	Determine, after scanning or skim reading, whether the information is relevant
✓	f	Cross reference within and across source documents to select information needed to perform a routine
✓	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

✓	a	Citation a fact or specification from a two column table or chart to find information
✓	b	Obtain a fact or specification from an intersection of a row by column table or chart
✓	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
✓	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

✓	a	Identify details, labels, numbers, and parts from an illustration or picture
✓	b	Identify parts or details according to a key or legend
✓	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
✓	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
✓	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
✓	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

✓	a	Use a simple linear path of an organizational chart to list events in sequential order
✓	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
✓	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

✓	a	Isolate each major section or entity presented in a schematic diagram
✓	b	Identify the components within each entity
✓	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
✓	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
✓	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

✓	a	Locate the block on a form to enter the appropriate information
✓	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
✓	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and non-nucleature, in appropriate sections of the form
✓	d	Write a descriptive account of an activity or transaction performed
✓	e	Use a completed form to locate or convey information

33. NOTE TAKING

✓	a	Distinguish between essential and non-essential details during the rule taking process
✓	b	Record details without misinterpreting the intent of either written material or an interview
✓	c	Rewrite all recorded details in sentence form
✓	d	Organize all sentences into paragraphs

NT

134 OUTLINING (Topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate indent numbers and letters to establish a hierarchy |

135 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

136 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

137 TYPE

- | | | |
|---|---|---|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing - communicating final instructions to others or giving an account in summary |
| ✓ | g | Council - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

138 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
| ✓ | c | Determine the appropriate amount of information to communicate |
| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step by step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal communications are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

139 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and inter personal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

140 PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

141 RECOGNITION

- | | | |
|---|---|--|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sight, sounds, touch, smells, or tastes to determine a course of action |

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, tens, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select hand(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEEDURAL DIFFICULTIES

- | | | |
|---|---|---|
| ✓ | a | Identify factual details or specifications that are found within a statement or written selection |
| ✓ | b | Select parts of text and visual materials to complete a task activity |
| ✓ | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| ✓ | d | Determine the essential message of a paragraph or section of written material |
| ✓ | e | Infer from a written source, which does not explicitly provide required information in order to make a decision |
| ✓ | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

- | | | |
|---|---|--|
| ✓ | a | Recognize common words and their meanings |
| ✓ | b | Recognize task related words with technical meanings |
| ✓ | c | Identify the correct meaning of a word from the context of a sentence |
| ✓ | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| ✓ | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

- | | | |
|---|---|---|
| ✓ | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| ✓ | b | Alphabetize words or topics to locate information |
| ✓ | c | Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| ✓ | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| ✓ | e | Determine, after scanning or skim reading, whether the information is relevant |
| ✓ | f | Cross reference within and across source documents to select information needed to perform a routine |
| ✓ | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

- | | | |
|---|---|---|
| ✓ | a | Obtain a fact or specification from a two column table or chart to find information |
| ✓ | b | Obtain a fact or specification from an intensification of a row by column table or chart |
| ✓ | c | Use a complex table or chart requiring cross referencing within or in combination with material outside the chart |
| ✓ | d | Apply information from tables and charts for locating malfunctions or for selecting a course of action |

VISUAL AIDS

NT

29. ILLUSTRATIONS

- | | | |
|---|---|---|
| ✓ | a | Identify details, labels, numbers, and parts from an illustration or picture |
| ✓ | b | Identify parts or details according to a key or legend |
| ✓ | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| ✓ | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system |
| ✓ | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| ✓ | f | Integrate information from various sources to select a course of action |

30. FLOW CHARTS

- | | | |
|---|---|--|
| ✓ | a | Use a simple linear path of an organizational chart to list events in sequential order |
| ✓ | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| ✓ | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

- | | | |
|---|---|--|
| ✓ | a | Isolate each major section or entity presented in a schematic diagram |
| ✓ | b | Identify the components within each entity |
| ✓ | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| ✓ | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| ✓ | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

- | | | |
|---|---|--|
| ✓ | a | Locate the block on a form to enter the appropriate information |
| ✓ | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| ✓ | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form |
| ✓ | d | Write a descriptive account of an activity or transaction performed |
| ✓ | e | Use a completed form to locate or compare information |

33. NOTE TAKING

- | | | |
|---|---|--|
| ✓ | a | Distinguish between essential and non essential details during the note taking process |
| ✓ | b | Record details without misinterpreting the intent of either written material or an interview |
| ✓ | c | Rewrite all recorded details in sentence form |
| ✓ | d | Organize all sentences into paragraphs |

NT

34 OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate titles for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Consult - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- Communicate clearly using the proper style of language
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed step by step directions
- Select feedback to confirm the accurate reception of the communication
- Recognize when a flow key informal dialogue is suitable
- Recognize when direct verbal comments are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured preplanned method of presentation

39 BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, tens, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mill as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to $360^\circ/10$ to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

110 SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

111 TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112 ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

113 MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

114 FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

115 GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F or C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

4/23/82

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret information from a written source, which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Analyze information from tables and charts for locating malfunctions, or for selecting a course of action.

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non essential details during the early stages of process.
- Record details without misinterpreting the intent of either written state of an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraph.

34. Verbal Communication Characteristics

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

17. TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing - communicating final instructions to others or giving an account in summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others in an order or action to be taken where a person has a position of authority

38. CHARACTERISTICS

- a. Enunciate clearly using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

17C Field Artillery Target Acquisition Specialist

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 9 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a greater/less ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pint, quart, gallon, liter
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select bands from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

15. GEOMETRY

- a. Draw geometric figures (plane and solid)
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret special relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F or C) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

4/23/82

CONTENT READING

VISUAL AIDS

NT

24. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart regarding cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (Topic on section 3)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, comma, and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ☒ a Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instruction a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing communicating final instructions to others or giving an account in summary
- ☒ g Council communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h Command communicating to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ☒ a Enunciate clearly, using the proper rate of speech
- ☒ b Use technical vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step by step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low key, informal dialogue is suitable
- ☒ h Recognize when direct verbal commands are necessary
- ☒ i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and inter personal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (motions, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, sights and smells
- ☒ g Infer from sights, sounds, touch, smell, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric systems
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24-hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select bend(s) from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table of art or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for describing a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (Topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate ideas for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, lightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

h. Interpret Codes or Symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through 10 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to $360^\circ/10$ to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) denotation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number or a single letter |

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
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<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
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<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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VISUAL AIDS

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
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30. FLOW CHARTS

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<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a description account of an activity or transaction performed
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33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non essential details during the note taking process
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<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34 OUTLINING (Topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
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- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
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- | | | |
|---|---|---|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
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| ✓ | f | Briefing - communicating final instructions to others or giving an account in summary |
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4/23/82

NT

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- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
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39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
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SAFETY/SECURITY

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- | | | |
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| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

h. Interpret Codes or Symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to $360^\circ/70$ to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Convert time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select handle(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with the corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a Hexagon and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying or borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hour or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Save parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Interpret a written source which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column, table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for specifying a course of action

4-200A

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional project or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components below to cause the problem
- Interpret symbols to indicate direction of flow, test points, connections and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. **OUTLINING** (Major and Subordinate)

- Distinguish between major and subordinate topics
- Generate ideas for each major topic selected
- Use primary or secondary to provide subordinate details under each major topic
- Alternate order of numbers and letters to establish a hierarchy

35. **REPORT WRITING**

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. **EDITING**

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. **TYPE**

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. **CHARACTERISTICS**

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to contribute and interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step by step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39. **BARRIERS**

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and inter-personal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. **PRECAUTIONS**

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. **RECOGNITION**

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, lightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- Interpret codes or Symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>N</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

13. SOLIDS

- a. Recognize and illustrate the names of solids with their corresponding figures

14. TERMINOLOGY

- a. Identify terms or words associated with geometric figures
b. Use a thesaurus (gathering defined) from spatial orientation

COMPUTE OR PERFORM

15. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

16. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

17. FRACTIONS: DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using the radical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of lines, (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34. OUTLINING (Topic to be tested)

- a. Distinguish between major and subordinate topics
- b. Generate ideas for each major topic selected
- c. Use primary or subsidiary to provide subordinate details under each major topic
- d. Alternate indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual: a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instructor: a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor: interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10): all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview: a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing: communicating final instructions to others or giving an account in summary
- g. Counsel: communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command: communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and interpersonal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4 TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select handle(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8 PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

26. PROCEDURAL DIRECTIONS

- | | | |
|---|---|--|
| ✓ | a | Identify factual details or specifications that are found within a statement or written selection |
| ✓ | b | Select parts of text and visual materials to complete a task activity |
| ✓ | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| ✓ | d | Determine the essential message of a paragraph or section of written material |
| ✓ | e | Infer from a written source, which does not explicitly provide required information, in order to make a decision |
| ✓ | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

- | | | |
|---|---|--|
| ✓ | a | Recognize common words and their meanings |
| ✓ | b | Recognize task related words with technical meanings |
| ✓ | c | Identify the correct meaning of a word from the context of a sentence |
| ✓ | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| ✓ | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

- | | | |
|---|---|---|
| ✓ | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| ✓ | b | Alphabetize words or topics to locate information |
| ✓ | c | Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| ✓ | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| ✓ | e | Determine, after scanning or skim reading, whether the information is relevant |
| ✓ | f | Cross reference within and across source documents to select information needed to perform a routine |
| ✓ | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

- | | | |
|---|---|--|
| ✓ | a | Obtain a fact or specification from a two column table or chart to find information |
| ✓ | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| ✓ | c | Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| ✓ | d | Apply information from tables and charts for locating malfunctions, or for selecting a course of action |

4/23/82

VISUAL AIDS

NT

29. ILLUSTRATIONS

- | | | |
|---|---|---|
| ✓ | a | Identify details, labels, numbers, and parts from an illustration or picture |
| ✓ | b | Identify parts or details according to a key or legend |
| ✓ | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| ✓ | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system |
| ✓ | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| ✓ | f | Integrate information from various sources to select a course of action |

30. FLOW CHARTS

- | | | |
|---|---|--|
| ✓ | a | Use a simple linear path of an organizational chart to list events in sequential order |
| ✓ | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| ✓ | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

- | | | |
|---|---|--|
| ✓ | a | Isolate each major section or entity presented in a schematic diagram |
| ✓ | b | Identify the components within each entity |
| ✓ | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| ✓ | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| ✓ | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

- | | | |
|---|---|--|
| ✓ | a | Locate the block on a form to enter the appropriate information |
| ✓ | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| ✓ | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form |
| ✓ | d | Write a descriptive account of an activity or transaction performed |
| ✓ | e | Use a completed form to locate or compare information |

33. NOTE TAKING

- | | | |
|---|---|--|
| ✓ | a | Distinguish between essential and non essential details during the note taking process |
| ✓ | b | Record details without misinterpreting the intent of either written material or an interview |
| ✓ | c | Rewrite all recorded details in sentence form |
| ✓ | d | Organize all sentences into paragraphs |

NT

38 CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step by step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and inter personal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- Interpret Codes or Symbols

35 REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- Spell frequently used words correctly
- Spell task related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110 SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

111 TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112 ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

113 MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

114 FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

115 GEOMETRY

- ☒ a Draw geometric figures: plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designations
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116 COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

117 GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

118 ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

119 TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skimming, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action.

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration at the time.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compile information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34	OUTLINING (topic or subtopic)	
a	Distinguish between major and subordinate topics	✓
b	Generate ideas for each major topic selected	✓
c	Use phrases or sentences to provide subordinate details under each major topic	✓
d	Alternate, indicate numbers and letters to establish a hierarchy	✓

35	REPORT WRITING	
a	State the intent or objective(s) of the report	✓
b	Describe the parameters of the event or situation	✓
c	Distinguish between relevant and irrelevant details	✓
d	Sequence events in the order they have occurred	✓
e	State general impressions of events described	✓
f	Select examples that will clarify major issues presented in the report	✓
g	Examine opposing points of view in the report	✓
h	Summarize the major points developed in the report	✓
i	Justify an action taken and give reasons for rejecting alternatives	✓

36	EDITING	
a	Spell frequently used words correctly	✓
b	Spell task-related words correctly	✓
c	Identify words that need to be capitalized	✓
d	Correct all misspelled words with or without the use of a reference source	✓
e	Apply all rules for end marks, commas, and apostrophes	✓
f	Apply common rules of grammar	✓
g	Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence	✓
h	Appraise an entire written communication and make adjustments to improve clarity	✓

VERBAL COMMUNICATION

37	TYPE	
a	Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed	✓
b	Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide	✓
c	Tutor - interaction takes place between two persons where one is instructing and the other is doing the task	✓
d	Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done	✓
e	Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task	✓
f	Briefing - communicating final instructions to others or giving an account in summary	✓
g	Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision	✓
h	Conference - communicate to others an order or action to be taken where a person is as a position of authority	✓

NT

38	CHARACTERISTICS	
a	Enunciate clearly, using the proper rate of speech	✓
b	Use technical vocabulary suitable to the task and level of the person	✓
c	Determine the appropriate amount of information to communicate	✓
d	Interpret figurative or idiomatic language by reference to its use in context	✓
e	Follow highly detailed, step-by-step directions	✓
f	Solicit feedback to confirm the accurate reception of the communication	✓
g	Recognize when a low key, informal dialogue is suitable	✓
h	Recognize when direct verbal commands are necessary	✓
i	Recognize when a prescribed series of verbal interactions is required to coordinate a group effort	✓
j	Recognize when the situation will require a structured, preplanned method of presentation	✓

39	BARRIERS	
a	Recognize the need for clear, concise directions in order to avoid language or word meaning differences	✓
b	Recognize personality factors and inter personal relationships that may exist	✓
c	Recognize feedback as a means of communicating more effectively and increasing task competence	✓

SAFETY/SECURITY

40	PRECAUTIONS	
a	Use common knowledge to avoid hazards in order to prevent injury to self or equipment	✓
b	Apply preventive measures prior to task performance to minimize any potential safety or security problem	✓
c	Select an appropriate course of action in the event of an emergency	✓

PERCEPTUAL

41	RECOGNITION	
a	Identify similarities and differences between and among objects	✓
b	Use body language (motions, gestures, postures) to communicate or signal	✓
c	Determine the presence of a defect or extent of damage	✓
d	Match objects by size, shape, color and significant markings	✓
e	Classify objects by size, shape, color and significant markings	✓
f	Determine direction, duration, and intensity of sounds, sightings and smells	✓
g	Infer from sights, sounds, touch, smells, or tastes to determine a course of action	✓

4/23/82

26Q Tactical Satellite/Microwave Systems Operator

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Express time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for standard time zones and day dates

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select bend(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify direct line that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SCOTIUS

- a Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a Identify technical words associated with geometric figures
— b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a Add or subtract whole numbers without carrying or borrowing
— b Add or subtract whole numbers, carrying and borrowing
— c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
— d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
— e Add or subtract to find correct time (24 hr. clock) using hours or minutes
— f Add or subtract various increments on gauges, dials, or any other measuring instrument
— g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
— h Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
— b Multiply and divide mixed numbers (whole and decimals)
— c Divide a number with decimals in both divisor and dividend
— d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
— e Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
— b Reduce fractions to lowest terms
— c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
— d Compute equivalent value of fractions, decimal, percent, and mixed numbers to lowest terms
— e Add and subtract fractions, with same or different denominators
— f Multiply and divide fractions with and without whole numbers
— g Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a Draw geometric figures, plane and solid
— b Match geometric figures with word names, equivalent measures
— c Label all parts of geometric figures using mathematical and characteristic designators
— d Use a protractor to measure angles, make geometrical constructions
— e Construct perpendicular on a line segment, bisector of an angle
— f Compute the perimeter and area of any figure
— g Compute the circumference and area of a circle
— h Compute the area and volume of any solid figure
— i Use formulas in solving problems involving geometric figures
— j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a Identify median and mode
— b Compute averages
— c Solve problems combining all processes using whole, mixed numbers and fractions
— d Solve problems, combining all processes, involving units of measurement
— e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
— f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
— g Solve problems involving ratio and proportion
— h Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
— b Identify points on a line graph
— c Match a graph with its equation

118. ALGEBRA

- a Solve simple algebraic equations with one unknown
— b Recognize and derive equivalent algebraic expressions
— c Evaluate powers and estimate roots

119. TRIGONOMETRY

- a Use tables of trigonometric functions
— b Use tables of logarithms to solve problems
— c Solve geometric problems using trigonometric functions
— d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PHOTOGRAPH DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Interpret from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Locate a fact or specification from a two column table or chart to find solution
- Locate a fact or specification from an intersection of a row by column table or chart
- Interpret a table or chart requiring cross referencing within or in combination of both material outside the chart
- Locate information from tables and charts for locating malfunctions, or for determining cause of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

AD-A143 593

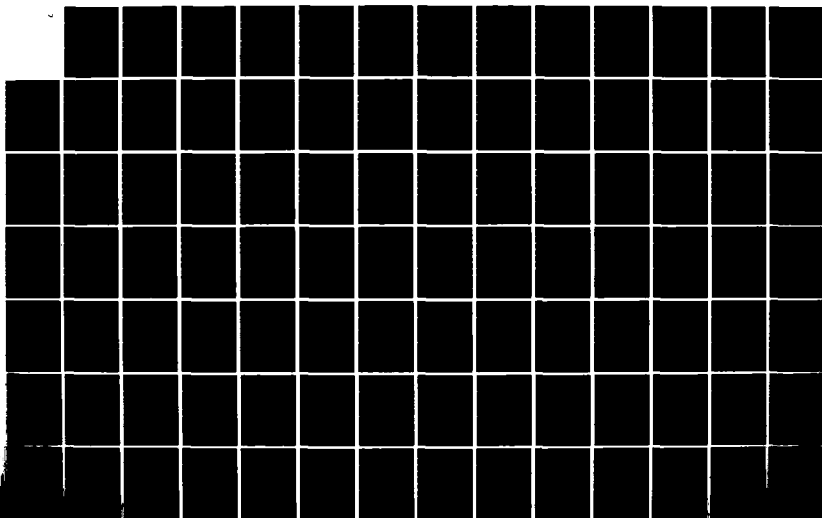
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

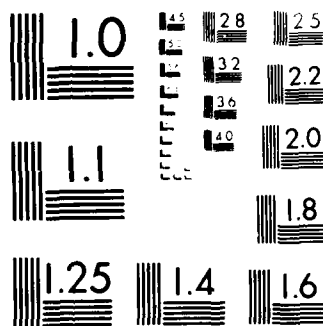
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NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NT

134 OUTLINING (topic or sentence)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate indent numbers and letters to establish a hierarchy

135 REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for rejecting alternatives

136 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task-related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, commas, and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

137 TYPE

- ☒ a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing - communicating final instructions to others or giving an account in summary
- ☒ g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

138 CHARACTERISTICS

- ☒ a Enunciate clearly, using the proper rate of speech
- ☒ b Use technical vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step-by-step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low key, informal dialogue is suitable
- ☒ h Recognize when direct verbal communication is necessary
- ☒ i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j Recognize when the situation will require a structured, preplanned method of presentation

139 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and inter personal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

140 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

141 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (motions, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

8SEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of (triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauge, dial, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

75. PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a. Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b. Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d. Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f. Synthesize information from written sources which contributes to the completion of a task activity

76. VOCABULARY

<input checked="" type="checkbox"/>	a. Recognize common words and their meanings
<input checked="" type="checkbox"/>	b. Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c. Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d. Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

77. REFERENCE SKILLS

<input checked="" type="checkbox"/>	a. Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b. Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e. Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f. Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g. Organize information from multiple sources into a sequenced series of events

78. TABLES/CHARTS

<input checked="" type="checkbox"/>	a. Obtain a fact or specification from a two-column table or chart to find information
<input checked="" type="checkbox"/>	b. Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

79. ILLUSTRATIONS

<input checked="" type="checkbox"/>	a. Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b. Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
<input checked="" type="checkbox"/>	e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

<input checked="" type="checkbox"/>	a. Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

<input checked="" type="checkbox"/>	a. Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b. Identify the components within each entity
<input checked="" type="checkbox"/>	c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

<input checked="" type="checkbox"/>	a. Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d. Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e. Use a completed form to locate or compare information

33. NOTE TAKING

<input checked="" type="checkbox"/>	a. Distinguish between essential and non essential details during the note taking process
<input checked="" type="checkbox"/>	b. Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c. Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d. Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects or signal |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, vernier, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

110. SOLIDS

- ✓ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ✓ a. Identify technical words associated with geometric figures
 ✓ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ✓ a. Add or subtract whole numbers, without carrying or borrowing
 ✓ b. Add or subtract whole numbers, carrying and borrowing
 ✓ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
 ✓ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
 ✓ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
 ✓ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
 ✓ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
 ✓ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ✓ a. Multiply and divide whole numbers
 ✓ b. Multiply and divide mixed numbers (whole and decimals)
 ✓ c. Divide a number with decimals in both divisor and dividend
 ✓ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
 ✓ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ✓ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
 ✓ b. Reduce fractions to lowest terms
 ✓ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
 ✓ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
 ✓ e. Add and subtract fractions, with same or different denominators
 ✓ f. Multiply and divide fractions with and without whole numbers
 ✓ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ✓ a. Draw geometric figures, plane and solid
 ✓ b. Match geometric figures with word names, equivalent measures
 ✓ c. Label all parts of geometric figures using mathematical and characteristic designators
 ✓ d. Use a protractor to measure angles, make geometrical constructions
 ✓ e. Construct perpendicular on a line segment, bisector of an angle
 ✓ f. Compute the perimeter and area of any figure
 ✓ g. Compute the circumference and area of a circle
 ✓ h. Compute the area and volume of any solid figure
 ✓ i. Use formulas in solving problems involving geometric figures
 ✓ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ✓ a. Identify median and mode
 ✓ b. Compute averages
 ✓ c. Solve problems combining all processes using whole, mixed numbers and fractions
 ✓ d. Solve problems, combining all processes, involving units of measurement
 ✓ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
 ✓ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
 ✓ g. Solve problems involving ratio and proportion
 ✓ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ✓ a. Identify coordinates of a point in any grid system
 ✓ b. Identify points on a line graph
 ✓ c. Match a graph with its equation

118. ALGEBRA

- ✓ a. Solve simple algebraic equations with one unknown
 ✓ b. Recognize and derive equivalent algebraic expressions
 ✓ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ✓ a. Use tables of trigonometric functions
 ✓ b. Use tables of logarithms to solve problems
 ✓ c. Solve geometric problems using trigonometric functions
 ✓ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skimming reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctioning or for identifying a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select a sample that will clarify major issues presented in the report
- g. Explain supporting points of view in the report
- h. Summarize the major events developed in the report
- i. State conclusions, risks, and give reasons for changing assumptions

36. PRESENTATION

- a. Speak intelligibly
- b. Speak clearly and with authority
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual -- a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction -- a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor -- interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) -- all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview -- a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing -- communicating final instructions to others or giving an account in summary
- g. Counsel -- communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command -- communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use the technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid misunderstandings
- b. Recognize the need for clear, concise directions in order to avoid misunderstandings
- c. Recognize the need for clear, concise directions in order to avoid misunderstandings
- d. Recognize the need for clear, concise directions in order to avoid misunderstandings
- e. Recognize the need for clear, concise directions in order to avoid misunderstandings
- f. Recognize the need for clear, concise directions in order to avoid misunderstandings
- g. Recognize the need for clear, concise directions in order to avoid misunderstandings
- h. Recognize the need for clear, concise directions in order to avoid misunderstandings
- i. Recognize the need for clear, concise directions in order to avoid misunderstandings
- j. Recognize the need for clear, concise directions in order to avoid misunderstandings

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, lightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

31M Multichannel Communications Equipment Operator

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 9 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mills

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hour
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) denotation on a scale
- Select hand(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauge, dial, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular to a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PRICING DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating materials, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of the written material during an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- ✓ Distinguish between major and subordinate topics
- ✓ Generate titles for each major topic selected
- ✓ Use phrases or sentences to provide subordinate details under each major topic
- ✓ Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ✓ State the intent or objective(s) of the report
- ✓ Describe the parameters of the event or situation
- ✓ Distinguish between relevant and irrelevant details
- ✓ Sequence events in the order they have occurred
- ✓ State general impressions of events described
- ✓ Select examples that will clarify major issues presented in the report
- ✓ Examine opposing points of view in the report
- ✓ Summarize the major points developed in the report
- ✓ Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ✓ Spell frequently used words correctly
- ✓ Spell task related words correctly
- ✓ Identify words that need to be capitalized
- ✓ Correct all misspelled words with or without the use of a reference source
- ✓ Apply all rules for end marks, commas, and apostrophes
- ✓ Apply common rules of grammar
- ✓ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ✓ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ✓ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ✓ Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ✓ Tutor - interaction takes place between two persons where one is instructing and the other is doing ... a task
- ✓ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ✓ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ✓ Briefing - communicating final instructions to others or giving an account in summary
- ✓ Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ✓ Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ✓ Enunciate clearly, using the proper rate of speech
- ✓ Use technical vocabulary suitable to the task and level of the person
- ✓ Determine the appropriate amount of information to communicate
- ✓ Interpret figurative or idiomatic language by reference to its use in context
- ✓ Follow highly detailed, step by step directions
- ✓ Solicit feedback to confirm the accurate reception of the communication
- ✓ Recognize when a low key, informal dialogue is suitable
- ✓ Recognize when direct verbal commands are necessary
- ✓ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ✓ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ✓ Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- ✓ Recognize personality factors and inter personal relationships that may exist
- ✓ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

140. PRECAUTIONS

- ✓ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ✓ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ✓ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

141. RECOGNITION

- ✓ Identify similarities and differences between and among objects
- ✓ Use body language (motions, gestures, postures) to communicate or signal
- ✓ Determine the presence of a defect or extent of damage
- ✓ Match objects by size, shape, color and significant markings
- ✓ Classify objects by size, shape, color and significant markings
- ✓ Determine direction, duration, and intensity of sounds, sightings and smells
- ✓ Infer from sights, sounds, touch, smell, or tastes to determine a course of action

3IN Tactical Circuit Controller

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBING AND COUNTING

- Match numerals with words names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric systems
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4 TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select handle(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8 PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110 SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111 TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112 ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

113 MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114 FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

115 GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116 COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117 GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118 ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119 TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCE DURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions in a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or convey information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- | | | |
|---|--|-------------------------------------|
| a | Distinguish between major and subordinate topics | <input checked="" type="checkbox"/> |
| b | Generate titles for each major topic selected | <input checked="" type="checkbox"/> |
| c | Use phrases or sentences to provide subordinate details under each major topic | <input checked="" type="checkbox"/> |
| d | Alternate, indent numbers and letters to establish a hierarchy | <input checked="" type="checkbox"/> |

35 REPORT WRITING

- | | | |
|---|--|-------------------------------------|
| a | State the intent or objective(s) of the report | <input checked="" type="checkbox"/> |
| b | Describe the parameters of the event or situation | <input checked="" type="checkbox"/> |
| c | Distinguish between relevant and irrelevant details | <input checked="" type="checkbox"/> |
| d | Sequence events in the order they have occurred | <input checked="" type="checkbox"/> |
| e | State general impressions of events described | <input checked="" type="checkbox"/> |
| f | Select examples that will clarify major issues presented in the report | <input checked="" type="checkbox"/> |
| g | Examine opposing points of view in the report | <input checked="" type="checkbox"/> |
| h | Summarize the major points developed in the report | <input checked="" type="checkbox"/> |
| i | Justify an action taken and give reasons for rejecting alternatives | <input checked="" type="checkbox"/> |

36 EDITING

- | | | |
|---|---|-------------------------------------|
| a | Spell frequently used words correctly | <input checked="" type="checkbox"/> |
| b | Spell task related words correctly | <input checked="" type="checkbox"/> |
| c | Identify words that need to be capitalized | <input checked="" type="checkbox"/> |
| d | Correct all misspelled words with or without the use of a reference source | <input checked="" type="checkbox"/> |
| e | Apply all rules for and marks, commas, and apostrophes | <input checked="" type="checkbox"/> |
| f | Apply common rules of grammar | <input checked="" type="checkbox"/> |
| g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence | <input checked="" type="checkbox"/> |
| h | Appraise an entire written communication and make adjustments to improve clarity | <input checked="" type="checkbox"/> |

VERBAL COMMUNICATION

- | | | |
|---|--|-------------------------------------|
| a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed | <input checked="" type="checkbox"/> |
| b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide | <input checked="" type="checkbox"/> |
| c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task | <input checked="" type="checkbox"/> |
| d | Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done | <input checked="" type="checkbox"/> |
| e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task | <input checked="" type="checkbox"/> |
| f | Briefing - communicating final instructions to others or giving an account in summary | <input checked="" type="checkbox"/> |
| g | Council - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision | <input checked="" type="checkbox"/> |
| h | Command - communicate to others in an order or action to be taken where a person has a position of authority | <input checked="" type="checkbox"/> |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|--|-------------------------------------|
| a | Enunciate clearly, using the proper rate of speech | <input checked="" type="checkbox"/> |
| b | Use technical vocabulary suitable to the task and level of the person | <input checked="" type="checkbox"/> |
| c | Determine the appropriate amount of information to communicate | <input checked="" type="checkbox"/> |
| d | Interpret figurative or idiomatic language by reference to its use in context | <input checked="" type="checkbox"/> |
| e | Follow highly detailed, step by step directions | <input checked="" type="checkbox"/> |
| f | Solicit feedback to confirm the accurate reception of the communication | <input checked="" type="checkbox"/> |
| g | Recognize when a low key, informal dialogue is suitable | <input checked="" type="checkbox"/> |
| h | Recognize when direct verbal commands are necessary | <input checked="" type="checkbox"/> |
| i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort | <input checked="" type="checkbox"/> |
| j | Recognize when the situation will require a structured, preplanned method of presentation | <input checked="" type="checkbox"/> |

39 BARRIERS

- | | | |
|---|---|-------------------------------------|
| a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences | <input checked="" type="checkbox"/> |
| b | Recognize personality factors and inter personal relationships that may exist | <input checked="" type="checkbox"/> |
| c | Recognize feedback as a means of communicating more effectively and increasing task competence | <input checked="" type="checkbox"/> |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|--|-------------------------------------|
| a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment | <input checked="" type="checkbox"/> |
| b | Apply preventive measures prior to task performance to minimize any potential safety or security problem | <input checked="" type="checkbox"/> |
| c | Select an appropriate course of action in the event of an emergency | <input checked="" type="checkbox"/> |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|-------------------------------------|
| a | Identify similarities and differences between and among objects | <input checked="" type="checkbox"/> |
| b | Use body language (motions, gestures, postures) to communicate or signal | <input checked="" type="checkbox"/> |
| c | Determine the presence of a defect or extent of damage | <input checked="" type="checkbox"/> |
| d | Match objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| e | Classify objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| f | Determine direction, duration, and intensity of sounds, sightings and smells | <input checked="" type="checkbox"/> |
| g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action | <input checked="" type="checkbox"/> |

3IN Tactical Circuit Controller

BSEP II

NUMERATION/PLACE VALUE

NT

1 NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils

4 TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

O-117

4/23/87

NT

5 GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8 PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PERIODICAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Solve parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Explain a fact or specification from a two column table or chart to find information
- Explain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

4.2.18.2

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Revise all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34	OUTLINING (topic or sentence)
a	Distinguish between major and subordinate topics
b	Generate titles for each major topic selected
c	Use phrases or sentences to provide subordinate details under each major topic
d	Alternate, indent numbers and letters to establish a hierarchy

35	REPORT WRITING
a	State the intent or objective(s) of the report
b	Describe the parameters of the event or situation
c	Distinguish between relevant and irrelevant details
d	Sequence events in the order they have occurred
e	State general impressions of events described
f	Select examples that will clarify major issues presented in the report
g	Examine opposing points of view in the report
h	Summarize the major points developed in the report
i	Justify an action taken and give reasons for rejecting alternatives

36	EDITING
a	Spell frequently used words correctly
b	Spell task related words correctly
c	Identify words that need to be capitalized
d	Correct all misspelled words with or without the use of a reference source
e	Apply all rules for end marks, commas, and apostrophes
f	Apply common rules of grammar
g	Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
h	Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37	TYPE
a	Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
b	Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
c	Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
d	Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
e	Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
f	Briefing - communicating final instructions to others or giving an account in summary
g	Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
h	Command - communicate to others in an order or action to be taken where a person has a position of authority

4/23/82

NT

38	CHARACTERISTICS
a	Enunciate clearly, using the proper rate of speech
b	Use technical vocabulary suitable to the task and level of the person
c	Determine the appropriate amount of information to communicate
d	Interpret figurative or idiomatic language by reference to its use in context
e	Follow highly detailed, step by step directions
f	Solicit feedback to confirm the accurate reception of the communication
g	Recognize when a low key, informal dialogue is suitable
h	Recognize when direct verbal commands are necessary
i	Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
j	Recognize when the situation will require a structured, preplanned method of presentation

39	BARRIERS
a	Recognize the need for clear, concise directions in order to avoid language or word meaning differences
b	Recognize personality factors and inter personal relationships that may exist
c	Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40	PRECAUTIONS
a	Use common knowledge to avoid hazards in order to prevent injury to self or equipment
b	Apply preventive measures prior to task performance to minimize any potential safety or security problem
c	Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41	RECOGNITION
a	Identify similarities and differences between and among objects
b	Use body language (motions, gestures, postures) to communicate or signal
c	Determine the presence of a defect or extent of damage
d	Match objects by size, shape, color and significant markings
e	Classify objects by size, shape, color and significant markings
f	Determine direction, duration, and intensity of sounds, lightings and smells
g	Infer from sights, sounds, touch, smells, or tastes to determine a course of action

31V Tactical Communications Systems Operator/Mechanic

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hour
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110 SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

111 TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112 ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

113 MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

114 FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

115 GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116 COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

117 GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

118 ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

119 TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

26 PROCESSIONAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written section
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of objects (s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action

30 FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31 SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, component, and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, designation of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33 NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non-essential details during the task activity process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h Interpret Codes and Symbols

320 Station Technical Controller

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hour, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compare time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) denotation on a scale
- Select band(s) from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular, be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles with the corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ___ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ___ a. Identify technical words associated with geometric figures
___ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ___ a. Add or subtract whole numbers, without carrying or borrowing
___ b. Add or subtract whole numbers, carrying and borrowing
___ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
___ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
___ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
___ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
___ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
___ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ___ a. Multiply and divide whole numbers
___ b. Multiply and divide mixed numbers (whole and decimals)
___ c. Divide a number with decimals in both divisor and dividend
___ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
___ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ___ a. Classify whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
___ b. Reduce fractions to lowest terms
___ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
___ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
___ e. Add and subtract fractions, with same or different denominators
___ f. Multiply and divide fractions with and without whole numbers
___ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ___ a. Draw geometric figures, plane and solid
___ b. Match geometric figures with word names, equivalent measures
___ c. Label all parts of geometric figures using mathematical and characteristic designators
___ d. Use a protractor to measure angles, make geometrical constructions
___ e. Construct perpendicular on a line segment, bisector of an angle
___ f. Compute the perimeter and area of any figure
___ g. Compute the circumference and area of a circle
___ h. Compute the area and volume of any solid figure
___ i. Use formulas in solving problems involving geometric figures
___ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ___ a. Identify median and mode
___ b. Compute averages
___ c. Solve problems combining all processes using whole, mixed numbers and fractions
___ d. Solve problems, combining all processes, involving units of measurement
___ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
___ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
___ g. Solve problems involving ratio and proportion
___ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ___ a. Identify coordinates of a point in any grid system
___ b. Identify points on a line graph
___ c. Match a graph with its equation

18. ALGEBRA

- ___ a. Solve simple algebraic equations with one unknown
___ b. Recognize and derive equivalent algebraic expressions
___ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ___ a. Use tables of trigonometric functions
___ b. Use tables of logarithms to solve problems
___ c. Solve geometric problems using trigonometric functions
___ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25 PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection.
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity.
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material.
<input checked="" type="checkbox"/>	e	Inter from a written source, which does not explicitly provide required information in order to make a decision.
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity.

26 VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings.
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings.
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence.
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms.
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27 REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title.
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information.
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant.
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine.
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events.

28 TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two column table or chart to find information.
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart.
<input checked="" type="checkbox"/>	c	Use a complete table or chart requiring cross referencing within or in combination with text material outside the chart.
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action.

NT

29 ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture.
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend.
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system.
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide.
<input checked="" type="checkbox"/>	f	Integrate information from various sources to select a course of action.

30 FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order.
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities.

31 SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram.
<input checked="" type="checkbox"/>	b	Identify the components within each entity.
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem.
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, component(s) and diagrammatic decision points.

WRITTEN COMMUNICATION

32 FORMS

<input checked="" type="checkbox"/>	a	Locate the blank on a form to enter the appropriate information.
<input checked="" type="checkbox"/>	b	Transfer a number, code date, figure or related data from one printed or written source onto an appropriate section of the form.
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, description of part or equipment, and nomenclature, in appropriate sections of the form.
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed.
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information.

33 NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non essential details during the interview process.
<input checked="" type="checkbox"/>	b	Record details without interrupting the intent of either writer or interviewee.
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form.
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs.

NT

14 OUTLINING (topic of sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate indent numbers and letters to establish a hierarchy |

15 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

16 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

17 TYPE

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend give or take advice or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

18 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

19 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

20 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

21 RECOGNITION

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smell, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through N in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric systems |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contrasts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Use a calendar and arrange dates and arrange dates in Julian style |
| <input checked="" type="checkbox"/> | e | Convert a time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Convert time including Greenwich Mean Time (GMT) as a basis for estimating time and distances |

NT

b. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demonstration on a scale |
| <input checked="" type="checkbox"/> | e | Select bands from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

b. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary, or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number or a single letter |

NT

10 SOLIDS

- _____ a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- _____ a Identify technical words associated with geometric figures
 _____ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- _____ a Add or subtract whole numbers, without carrying or borrowing
 _____ b Add or subtract whole numbers, carrying and borrowing
 _____ c Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
 _____ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
 _____ e Add or subtract to find correct time (24 hr clock) using hours or minutes
 _____ f Add or subtract various increments on gauges, dials, or any other measuring instrument
 _____ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
 _____ h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- _____ a Multiply and divide whole numbers
 _____ b Multiply and divide mixed numbers (whole and decimals)
 _____ c Divide a number with decimals in both divisor and dividend
 _____ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
 _____ e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- _____ a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
 _____ b Reduce fractions to lowest terms
 _____ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
 _____ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
 _____ e Add and subtract fractions, with same or different denominators
 _____ f Multiply and divide fractions with and without whole numbers
 _____ g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- _____ a Draw geometric figures, plane and solid
 _____ b Match geometric figures with word names, equivalent measures
 _____ c Label all parts of geometric figures using mathematical and characteristic designators
 _____ d Use a protractor to measure angles, make geometrical constructions
 _____ e Construct perpendicular on a line segment, bisector of an angle
 _____ f Compute the perimeter and area of any figure
 _____ g Compute the circumference and area of a circle
 _____ h Compute the area and volume of any solid figure
 _____ i Use formulas in solving problems involving geometric figures
 _____ j Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- _____ a Identify median and mode
 _____ b Compute averages
 _____ c Solve problems combining all processes using whole, mixed numbers and fractions
 _____ d Solve problems, combining all processes, involving units of measurement
 _____ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
 _____ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}\text{F}$ or $^{\circ}\text{C}$) measures
 _____ g Solve problems involving ratio and proportion
 _____ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- _____ a Identify coordinates of a point in any grid system
 _____ b Identify points on a line graph
 _____ c Match a graph with its equation

18 ALGEBRA

- _____ a Solve simple algebraic equations with one unknown
 _____ b Recognize and derive equivalent algebraic expressions
 _____ c Evaluate powers and estimate roots

19 TRIGONOMETRY

- _____ a Use tables of trigonometric functions
 _____ b Use tables of logarithms to solve problems
 _____ c Solve geometric problems using trigonometric functions
 _____ d Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by call number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column, table or chart to read or write
- Obtain a fact or specification from an intersect of a row by column table or chart
- Use a complex table or the following cross-referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and logical directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, time or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, destination of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the reading process
- Record details without misinterpreting the intent of entry, with single words or an interview
- Revise or reword details in sentence form
- Organize all sentences into paragraphs

NT

134 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

135 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

136 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

137 TYPE

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

NT

138 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

139 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

140 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

141 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

4/23/82

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Express time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify conditions that tools, hardware or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs
- Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems containing all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

NT

25. PROCESSIONAL DIRECTIONS

- Identify the details or specifications that are found within a statement or written selection
- Select parts of text and visual material to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Inter from a written source, which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source (document by code number and title)
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Explain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Analyze information from tables and charts for locating malfunctions, or for selecting sequence of action

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly disassembly
- Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to propose visual and textual directions to a procedure, to arrive at decision points and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate up to major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the task taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a ☒ Distinguish between major and subordinate topics
- b ☒ Generate titles for each major topic selected
- c ☒ Use phrases or sentences to provide subordinate details under each major topic
- d ☒ Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a ☒ State the intent or objective(s) of the report
- b ☒ Describe the parameters of the event or situation
- c ☒ Distinguish between relevant and irrelevant details
- d ☒ Sequence events in the order they have occurred
- e ☒ State general impressions of events described
- f ☒ Select examples that will clarify major issues presented in the report
- g ☒ Examine opposing points of view in the report
- h ☒ Summarize the major points developed in the report
- i ☒ Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a ☒ Spell frequently used words correctly
- b ☒ Spell task related words correctly
- c ☒ Identify words that need to be capitalized
- d ☒ Correct all misspelled words with or without the use of a reference source
- e ☒ Apply all rules for end marks, commas, and apostrophes
- f ☒ Apply common rules of grammar
- g ☒ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h ☒ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a ☒ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b ☒ Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c ☒ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d ☒ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e ☒ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f ☒ Briefing - communicating final instructions to others or giving an account in summary
- g ☒ Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h ☒ Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a ☒ Enunciate clearly, using the proper rate of speech
- b ☒ Use technical vocabulary suitable to the task and level of the person
- c ☒ Determine the appropriate amount of information to communicate
- d ☒ Interpret figurative or idiomatic language by reference to its use in context
- e ☒ Follow highly detailed, step by step directions
- f ☒ Solicit feedback to confirm the accurate reception of the communication
- g ☒ Recognize when a low key, informal dialogue is suitable
- h ☒ Recognize when direct verbal commands are necessary
- i ☒ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j ☒ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a ☒ Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b ☒ Recognize personality factors and inter personal relationships that may exist
- c ☒ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a ☒ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b ☒ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c ☒ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a ☒ Identify similarities and differences between and among objects
- b ☒ Use body language (motions, gestures, postures) to communicate or signal
- c ☒ Determine the presence of a defect or extent of damage
- d ☒ Match objects by size, shape, color and significant markings
- e ☒ Classify objects by size, shape, color and significant markings
- f ☒ Determine direction, duration, and intensity of sounds, sightings and smells
- g ☒ Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h ☒ Interpret codes or symbols

4/23/82

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>N</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

6. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select bend(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

16. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify dimensions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

110. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F or C) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

118. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROBABILISTIC DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
 - b Select parts of text and visual materials to complete a task activity
 - c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
 - d Determine the essential message of a paragraph or section of written material
 - e Infer from a written source, which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or a combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for measuring a function

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order as a guide
- f Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a Isolate each major section or entry presented in a schematic diagram
- b Identify the components within each entry
- c Trace connections in an integrated circuit from their origin to another point within or from one entry to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33. NOTE TAKING

- a Distinguish between essential and non essential details during the study of a process
- b Record details with the intent of retaining the intent of either written material or an interview
- c Rewrite all recorded details in one's own form
- d Organize all sentences into paragraphs

NT

134. OUTLINING (topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate ideas for each major topic select d |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate, indent numbers and letters to establish a hierarchy |

135. REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

136. EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

137. TYPE

- | | | |
|---|---|---|
| ✓ | a | Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing communicating final instructions to others or giving an account in summary |
| ✓ | g | Counsel communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command communicate to others an order or action to be taken where a person has a position of authority |

NT

138. CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
| ✓ | c | Determine the appropriate amount of information to communicate |
| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step by step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal communications are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

139. BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and inter personal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

140. PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

141. RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

4/23/82

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through 9 in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lessor from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, tens, fives, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mill as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) denotation on a scale
- e. Select bend(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25 PROCEDURAL DIRECTIONS

<input checked="" type="checkbox"/>	a	Identify factual details or specifications that are found within a statement or written selection
<input checked="" type="checkbox"/>	b	Select parts of text and visual materials to complete a task activity
<input checked="" type="checkbox"/>	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
<input checked="" type="checkbox"/>	d	Determine the essential message of a paragraph or section of written material
<input checked="" type="checkbox"/>	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
<input checked="" type="checkbox"/>	f	Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

<input checked="" type="checkbox"/>	a	Recognize common words and their meanings
<input checked="" type="checkbox"/>	b	Recognize task related words with technical meanings
<input checked="" type="checkbox"/>	c	Identify the correct meaning of a word from the context of a sentence
<input checked="" type="checkbox"/>	d	Recognize the meaning of common contractions, abbreviations and acronyms
<input checked="" type="checkbox"/>	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

<input checked="" type="checkbox"/>	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
<input checked="" type="checkbox"/>	b	Alphabetize words or topics to locate information
<input checked="" type="checkbox"/>	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
<input checked="" type="checkbox"/>	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
<input checked="" type="checkbox"/>	e	Determine, after scanning or skim reading, whether the information is relevant
<input checked="" type="checkbox"/>	f	Cross reference within and across source documents to select information needed to perform a routine
<input checked="" type="checkbox"/>	g	Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

<input checked="" type="checkbox"/>	a	Obtain a fact or specification from a two-column table or chart to find information
<input checked="" type="checkbox"/>	b	Obtain a fact or specification from an intersection of a row by column table or chart
<input checked="" type="checkbox"/>	c	Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
<input checked="" type="checkbox"/>	d	Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29 ILLUSTRATIONS

<input checked="" type="checkbox"/>	a	Identify details, labels, numbers, and parts from an illustration or picture
<input checked="" type="checkbox"/>	b	Identify parts or details according to a key or legend
<input checked="" type="checkbox"/>	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
<input checked="" type="checkbox"/>	d	Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system
<input checked="" type="checkbox"/>	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action

30 FLOW CHARTS

<input checked="" type="checkbox"/>	a	Use a simple linear path of an organizational chart to list events in sequential order
<input checked="" type="checkbox"/>	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
<input checked="" type="checkbox"/>	c	Translate the significance of the symbols into physical activities

31 SCHEMATICS

<input checked="" type="checkbox"/>	a	Isolate each major section or entity presented in a schematic diagram
<input checked="" type="checkbox"/>	b	Identify the components within each entity
<input checked="" type="checkbox"/>	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
<input checked="" type="checkbox"/>	d	Isolate a problem component in a schematic and trace it to components believed to cause the problem
<input checked="" type="checkbox"/>	e	Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

<input checked="" type="checkbox"/>	a	Locate the block on a form to enter the appropriate information
<input checked="" type="checkbox"/>	b	Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
<input checked="" type="checkbox"/>	c	Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
<input checked="" type="checkbox"/>	d	Write a descriptive account of an activity or transaction performed
<input checked="" type="checkbox"/>	e	Use a completed form to locate or compare information

33 NOTE TAKING

<input checked="" type="checkbox"/>	a	Distinguish between essential and non essential details during the note taking process
<input checked="" type="checkbox"/>	b	Record details without misinterpreting the intent of either written material or an interview
<input checked="" type="checkbox"/>	c	Rewrite all recorded details in sentence form
<input checked="" type="checkbox"/>	d	Organize all sentences into paragraphs

NT

14 OUTLINING (topic or sentence)

- | | | |
|---|--|-------------------------------------|
| a | Distinguish between major and subordinate topics | <input checked="" type="checkbox"/> |
| b | Generate titles for each major topic selected | <input checked="" type="checkbox"/> |
| c | Use phrases or sentences to provide subordinate details under each major topic | <input checked="" type="checkbox"/> |
| d | Alternate, indent numbers and letters to establish a hierarchy | <input checked="" type="checkbox"/> |

15 REPORT WRITING

- | | | |
|---|--|-------------------------------------|
| a | State the intent or objective(s) of the report | <input checked="" type="checkbox"/> |
| b | Describe the parameters of the event or situation | <input checked="" type="checkbox"/> |
| c | Distinguish between relevant and irrelevant details | <input checked="" type="checkbox"/> |
| d | Sequence events in the order they have occurred | <input checked="" type="checkbox"/> |
| e | State general impressions of events described | <input checked="" type="checkbox"/> |
| f | Select examples that will clarify major issues presented in the report | <input checked="" type="checkbox"/> |
| g | Examine opposing points of view in the report | <input checked="" type="checkbox"/> |
| h | Summarize the major points developed in the report | <input checked="" type="checkbox"/> |
| i | Justify an action taken and give reasons for rejecting alternatives | <input checked="" type="checkbox"/> |

16 EDITING

- | | | |
|---|---|-------------------------------------|
| a | Spell frequently used words correctly | <input checked="" type="checkbox"/> |
| b | Spell task related words correctly | <input checked="" type="checkbox"/> |
| c | Identify words that need to be capitalized | <input checked="" type="checkbox"/> |
| d | Correct all misspelled words with or without the use of a reference source | <input checked="" type="checkbox"/> |
| e | Apply all rules for end marks, commas, and apostrophes | <input checked="" type="checkbox"/> |
| f | Apply common rules of grammar | <input checked="" type="checkbox"/> |
| g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence | <input checked="" type="checkbox"/> |
| h | Appraise an entire written communication and make adjustments to improve clarity | <input checked="" type="checkbox"/> |

VERBAL COMMUNICATION

17 TYPE

- | | | |
|---|--|-------------------------------------|
| a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed | <input checked="" type="checkbox"/> |
| b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide | <input checked="" type="checkbox"/> |
| c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task | <input checked="" type="checkbox"/> |
| d | Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done | <input checked="" type="checkbox"/> |
| e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task | <input checked="" type="checkbox"/> |
| f | Briefing - communicating final instructions to others or giving an account in summary | <input checked="" type="checkbox"/> |
| g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision | <input checked="" type="checkbox"/> |
| h | Command - communicate to others an order or action to be taken where a person has a position of authority | <input checked="" type="checkbox"/> |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|--|-------------------------------------|
| a | Enunciate clearly, using the proper rate of speech | <input checked="" type="checkbox"/> |
| b | Use technical vocabulary suitable to the task and level of the person | <input checked="" type="checkbox"/> |
| c | Determine the appropriate amount of information to communicate | <input checked="" type="checkbox"/> |
| d | Interpret figurative or idiomatic language by reference to its use in context | <input checked="" type="checkbox"/> |
| e | Follow highly detailed, step by step directions | <input checked="" type="checkbox"/> |
| f | Solicit feedback to confirm the accurate reception of the communication | <input checked="" type="checkbox"/> |
| g | Recognize when a low key, informal dialogue is suitable | <input checked="" type="checkbox"/> |
| h | Recognize when direct verbal communications are necessary | <input checked="" type="checkbox"/> |
| i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort | <input checked="" type="checkbox"/> |
| j | Recognize when the situation will require a structured, preplanned method of presentation | <input checked="" type="checkbox"/> |

39 BARRIERS

- | | | |
|---|---|-------------------------------------|
| a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences | <input checked="" type="checkbox"/> |
| b | Recognize personality factors and inter personal relationships that may exist | <input checked="" type="checkbox"/> |
| c | Recognize feedback as a means of communicating more effectively and increasing task competence | <input checked="" type="checkbox"/> |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|--|-------------------------------------|
| a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment | <input checked="" type="checkbox"/> |
| b | Apply preventive measures prior to task performance to minimize any potential safety or security problem | <input checked="" type="checkbox"/> |
| c | Select an appropriate course of action in the event of an emergency | <input checked="" type="checkbox"/> |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|-------------------------------------|
| a | Identify similarities and differences between and among objects | <input checked="" type="checkbox"/> |
| b | Use body language (motions, gestures, postures) to communicate or signal | <input checked="" type="checkbox"/> |
| c | Determine the presence of a defect or extent of damage | <input checked="" type="checkbox"/> |
| d | Match objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| e | Classify objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| f | Determine direction, duration, and intensity of sound, sightings and smells | <input checked="" type="checkbox"/> |
| g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action | <input checked="" type="checkbox"/> |

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>N</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3 DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mill as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4 TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5 GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems subsystems and components |

GEOMETRY

7 LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8 PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9 ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

4/23/82

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify factual details or specifications that are found within a statement or written selection |
| <input checked="" type="checkbox"/> | b | Select parts of text and visual materials to complete a task activity |
| <input checked="" type="checkbox"/> | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d | Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e | Infer from a written source, which does not explicitly provide required information, in order to make a decision |
| <input checked="" type="checkbox"/> | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b | Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c | Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| <input checked="" type="checkbox"/> | b | Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c | Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| <input checked="" type="checkbox"/> | e | Determine, after scanning or skim reading, whether the information is relevant |
| <input checked="" type="checkbox"/> | f | Cross reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Obtain a fact or specification from a two column table or chart to find information |
| <input checked="" type="checkbox"/> | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c | Use a complex table or chart requiring cross referencing within or in continuation with text material outside the chart |
| <input checked="" type="checkbox"/> | d | Apply information from tables and charts for locating malfunctions, or for selecting a course of action |

VISUAL AIDS

NT

29. ILLUSTRATIONS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action |

30. FLOW CHARTS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| <input checked="" type="checkbox"/> | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Isolate each major section or entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b | Identify the components within each entity |
| <input checked="" type="checkbox"/> | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form |
| <input checked="" type="checkbox"/> | d | Write a descriptive account of an activity or transaction performed |
| <input checked="" type="checkbox"/> | e | Use a completed form to locate or complete information |

33. NOTE-TAKING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between essential and non-essential details during the note taking process |
| <input checked="" type="checkbox"/> | b | Record details without misinterpreting the intent of either written material or an interview |
| <input checked="" type="checkbox"/> | c | Rewrite all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d | Organize all sentences into paragraphs |

NT

34 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

BSEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING, AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>N</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) denotation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

25 PROCEDURAL DIRECTIONS

✓	a	Identify factual details or specifications that are found within a statement or written selection
✓	b	Select parts of text and visual materials to complete a task activity
✓	c	Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
✓	d	Determine the essential message of a paragraph or section of written material
✓	e	Infer from a written source, which does not explicitly provide required information, in order to make a decision
✓	f	Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

✓	a	Recognize common words and their meanings
✓	b	Recognize task related words with technical meanings
✓	c	Identify the correct meaning of a word from the context of a sentence
✓	d	Recognize the meaning of common contractions, abbreviations and acronyms
✓	e	Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

✓	a	Locate a Technical Manual, Field Manual or any related source document by code number and title
✓	b	Alphabetize words or topics to locate information
✓	c	Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
✓	d	Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
✓	e	Determine after scanning or skimming, whether the information is relevant
✓	f	Cross reference within and across source documents to select information needed to perform a routine
✓	g	Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

✓	a	Obtain a fact or specification from a two column table or chart to find information
✓	b	Obtain a fact or specification from an integration of a row by column table or chart
✓	c	Use a complex table or chart requiring cross referencing within or in conjunction with text material outside the chart
✓	d	Apply information from tables and charts to looking equations or for working a course of action

NT

NT

29 ILLUSTRATIONS

✓	a	Identify details, labels, numbers, and parts from an illustration or picture
✓	b	Identify parts or details according to a key or legend
✓	c	Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
✓	d	Interpret a three dimensional projection or exploded view of object for assembly, disassembly, or position in system or sub system
✓	e	Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action

30 FLOW CHARTS

✓	a	Use a simple linear path of an organizational chart to list events in sequential order
✓	b	Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
✓	c	Translate the significance of the symbols into physical activities

31 SCHEMATICS

✓	a	Isolate each major section or entity presented in a schematic diagram
✓	b	Identify the components within each entity
✓	c	Trace connections in an integrated circuit from their origin to another point within or from one entity to another
✓	d	Isolate a problem component in a schematic and take it to components to solve the problem
✓	e	Interpret symbols to indicate direction of flow, test point is, complexity and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

✓	a	Locate the block on a form to enter the appropriate information
✓	b	Transfer a number, code, date, figure or related data from a given source written sources onto an appropriate section of the form
✓	c	Write the name of the organization, responsible personnel, discipline, part or equipment, and nomenclature in appropriate section of the form
✓	d	Write a descriptive account of an activity or transaction performed
✓	e	Use a completed form to locate or compare information

33 NOTE TAKING

✓	a	Distinguish between a verbal and a written record of details during a process
✓	b	Record details without misinterpreting the intent of either written or verbal interview
✓	c	Rewrite all recorded details in sentence form
✓	d	Organize all sentences into paragraphs

NT

34. Distinguishing (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate ideas for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate subject numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instructor a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing communicating final instructions to others or giving an account in summary
- g. Council communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal communications are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

NT

6. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display; read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) deviation of a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimension drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a Identify technical words associated with geometric figures
— b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
— b Add or subtract whole numbers, carrying and borrowing
— c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
— d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
— e Add or subtract to find correct time (24 hr. clock) using hours or minutes
— f Add or subtract various increments on gauges, dials, or any other measuring instrument
— g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
— h Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
— b Multiply and divide mixed numbers (whole and decimals)
— c Divide a number with decimals in both divisor and dividend
— d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
— e Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
— b Reduce fractions to lowest terms
— c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
— d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
— e Add and subtract fractions, with same or different denominators
— f Multiply and divide fractions with and without whole numbers
— g Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a Draw geometric figures, plane and solid
— b Match geometric figures with word names, equivalent measures
— c Label all parts of geometric figures using mathematical and characteristic designations
— d Use a protractor to measure angles, make geometrical constructions
— e Construct perpendicular on a line segment, bisector of an angle
— f Compute the perimeter and area of any figure
— g Compute the circumference and area of a circle
— h Compute the area and volume of any solid figure
— i Use formulas in solving problems involving geometric figures
— j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

118. COMBINATION OF PROCESSES

- a Identify median and mode
— b Compute averages
— c Solve problems combining all processes using whole, mixed numbers and fractions
— d Solve problems, combining all processes, involving units of measurement
— e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
— f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
— g Solve problems involving ratio and proportion
— h Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
— b Identify points on a line graph
— c Match a graph with its equation

118. ALGEBRA

- a Solve simple algebraic equations with one unknown
— b Recognize and derive equivalent algebraic expressions
— c Evaluate powers and estimate roots

119. TRIGONOMETRY

- a Use tables of trigonometric functions
— b Use tables of logarithms to solve problems
— c Solve geometric problems using trigonometric functions
— d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written activity.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed step by step direction in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts for locating multifunctions, or for tracing a course of action.

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non essential details during the interview process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

14 OUTLINING (topic or selected)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate subject numbers and letters to establish a hierarchy

15 REPORT WRITING

- ☒ a State the intent or subject level(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for rejecting alternatives

16 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, commas, and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ☒ a Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instruction a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Tutor interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing communicating final instructions to others or giving an account in summary
- ☒ g Counsel communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h Command communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- ☒ a Enunciate clearly, using the proper rate of speech
- ☒ b Use technical vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step by step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low key, informal dialogue is suitable
- ☒ h Recognize when direct verbal commands are necessary
- ☒ i Recognize when a prescribed series of verbal interaction is required to coordinate a group effort
- ☒ j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and inter personal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (motions, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g Infer from sights, sounds, touch, smell, or tastes to determine a course of action

4/23/82

NUMERATION/PLACE VALUE

NT

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/lesser from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, two's, five's, ten's, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

b. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying or borrowing
☒ c. Add and subtract (borrowing and carrying with mixed numbers (whole and decimals))
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18 ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- | | | |
|---|---|--|
| ✓ | a | Identify factual details or specifications that are found within a statement or written selection |
| ✓ | b | Select parts of text and visual materials to complete a task activity |
| ✓ | c | Follow highly detailed, step by step directions in order to accomplish a sequence of task activities |
| ✓ | d | Determine the essential message of a paragraph or section of written material |
| ✓ | e | Infer from a written source, which does not explicitly provide required information, in order to make a decision |
| ✓ | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

- | | | |
|---|---|--|
| ✓ | a | Recognize common words and their meanings |
| ✓ | b | Recognize task related words with technical meanings |
| ✓ | c | Identify the correct meaning of a word from the context of a sentence |
| ✓ | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| ✓ | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

- | | | |
|---|---|---|
| ✓ | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| ✓ | b | Alphabetize words or topics to locate information |
| ✓ | c | Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| ✓ | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| ✓ | e | Determine, after scanning or skim reading, whether the information is relevant |
| ✓ | f | Cross reference within and across source documents to select information needed to perform a routine |
| ✓ | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

- | | | |
|---|---|--|
| ✓ | a | Obtain a fact or specification from a two column table or chart to find information |
| ✓ | b | Obtain a fact or specification from an intersection of a two by column table or chart |
| ✓ | c | Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| ✓ | d | Apply information from tables and charts for locating multifunctions, or for planning a course of action |

VISUAL AIDS

NT

29. ILLUSTRATIONS

- | | | |
|---|---|---|
| ✓ | a | Identify details, labels, numbers, and parts from an illustration or picture |
| ✓ | b | Identify parts or details according to a key or legend |
| ✓ | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| ✓ | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system |
| ✓ | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| ✓ | f | Integrate information from various sources to select a course of action |

30. FLOW CHARTS

- | | | |
|---|---|--|
| ✓ | a | Use a simple linear path of an organizational chart to list events in sequential order |
| ✓ | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| ✓ | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

- | | | |
|---|---|--|
| ✓ | a | Isolate each major section or entity presented in a schematic diagram |
| ✓ | b | Identify the components within each entity |
| ✓ | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| ✓ | d | Isolate a problem component in a schematic and trace it to components needed to cause the problem |
| ✓ | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

- | | | |
|---|---|--|
| ✓ | a | Locate the block on a form to enter the appropriate information |
| ✓ | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| ✓ | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and non-nomenclature, in appropriate sections of the form |
| ✓ | d | Write a descriptive account of an activity or transaction performed |
| ✓ | e | Use a completed form to locate or compare information |

33. NOTE-TAKING

- | | | |
|---|---|--|
| ✓ | a | Distinguish between essential and non-essential details during the note taking process |
| ✓ | b | Record details without misinterpreting the intent of either written material or an interview |
| ✓ | c | Rewrite all recorded details in sentence form |
| ✓ | d | Organize all sentences into paragraphs |

NT

34 OUTLINING (topic or sentence)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|---|---|---|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing - communicating final instructions to others or giving an account in summary |
| ✓ | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
| ✓ | c | Determine the appropriate amount of information to communicate |
| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step by step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal commands are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and interpersonal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearing, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing times and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select bands from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEDURAL INSTRUCTIONS

- Identify factual details or specifications that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task or activity.
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task-related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page title, paragraph figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action.

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects (sketch assembly, disassembly, or position in system or sub system).
- Follow illustrations, or photographs, arranged in a sequential order as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure to arrive at decision points and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

134 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate lines for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate indent numbers and letters to establish a hierarchy |

135 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

136 EDITING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

137 TYPE

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instructor a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

138 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

139 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

140 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

141 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time in hours and tenths of hours
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Isolate from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by title, number and title.
- Apply letter words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine after scanning or skimming, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a task.
- Organize information from multiple sources into a sequential series of events.

28. TABLES/CHARTS

- Identify a fact or specification from a two column, table or chart to find a specific item.
- Identify a fact or specification from an interpretation of a two by column table or chart.
- Identify a fact or specification from a sequencing cross referencing within or in combination with a table or chart.
- Identify a fact or specification from a sequencing cross referencing within or in combination with a table or chart.

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all recorded details into paragraphs.

NT

14. OUTLINING (Major or Subordinate)

- ☒ a. Develop both a major and subordinate topics
- ☒ b. Generate ideas for each major topic selected
- ☒ c. Use the plan and flow charts to provide subordinate details under each major topic
- ☒ d. Alternate the numbers and letters to establish a hierarchy

15. REPORT WRITING

- ☒ a. State the subject or object (level) of the report
- ☒ b. Describe the parameters of the event or situation
- ☒ c. Distinguish between relevant and irrelevant details
- ☒ d. Sequence events in the order they have occurred
- ☒ e. State general impressions of events described
- ☒ f. Select examples that will clarify major issues presented in the report
- ☒ g. Examine opposing points of view in the report
- ☒ h. Summarize the major points developed in the report
- ☒ i. Justify an action taken and give reasons for rejecting alternatives

16. EDITING

- ☒ a. Spell frequently used words correctly
- ☒ b. Spell task related words correctly
- ☒ c. Identify words that need to be capitalized
- ☒ d. Correct all misspelled words with or without the use of a reference source
- ☒ e. Apply all rules for end marks, commas, and apostrophes
- ☒ f. Apply common rules of grammar
- ☒ g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

137. TYPE

- ☒ a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f. Briefing - communicating final instructions to others or giving an account in summary
- ☒ g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h. Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

18. CHARACTERISTICS

- ☒ a. Enunciate clearly using the proper level of speech
- ☒ b. Use technical vocabulary suitable to the task and level of the person
- ☒ c. Determine the appropriate amount of information for a given mode
- ☒ d. Interpret figurative or idiomatic language by reference to its use in context
- ☒ e. Follow highly detailed step by step directions
- ☒ f. Solicit feedback to confirm the accurate reception of the communication
- ☒ g. Recognize when a low key informal dialogue is suitable
- ☒ h. Recognize when direct verbal communications are necessary
- ☒ i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j. Recognize when the situation will require a structured preplanned method of presentation

39. BARRIERS

- ☒ a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b. Recognize personality factors and inter personal relationships that may exist
- ☒ c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- ☒ a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- ☒ a. Identify similarities and differences between and among objects
- ☒ b. Use body language (motions, gestures, postures) to communicate or signal
- ☒ c. Determine the presence of a defect or extent of damage
- ☒ d. Match objects by size, shape, color and significant markings
- ☒ e. Classify objects by size, shape, color and significant markings
- ☒ f. Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g. Infer from sight, sounds, touch, smell, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through 10 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, twos, fives, tens, etc. back word or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Calculate time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) denotation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or lettered intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily unstable |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, changeover or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular, be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, and their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Analyze information from tables and charts for locating malfunctions, or for locating a step of a task

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of objects (e.g.) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34	OUTLINING (topic or subject)
a	Distinguish between major and subordinate topics
b	Generate ideas for each major topic selected
c	Use phrases or sentences to provide subordinate details under each major topic
d	Alternate indent numbers and letters to establish a hierarchy

35	REPORT WRITING
a	State the intent or objective(s) of the report
b	Describe the parameters of the event or situation
c	Distinguish between relevant and irrelevant details
d	Sequence events in the order they have occurred
e	State general impressions of events described
f	Select examples that will clarify major issues presented in the report
g	Examine opposing points of view in the report
h	Summarize the major points developed in the report
i	Justify an action taken and give reasons for rejecting alternatives

36	EDITING
a	Spell frequently used words correctly
b	Spell task related words correctly
c	Identify words that need to be capitalized
d	Correct all misspelled words with or without the use of a reference source
e	Apply all rules for end marks, commas, and apostrophes
f	Apply common rules of grammar
g	Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
h	Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37	TYPE
a	Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
b	Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
c	Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
d	Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
e	Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
f	Briefing - communicating final instructions to others or giving an account in summary
g	Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
h	Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38	CHARACTERISTICS
a	Enunciate clearly, using the proper rate of speech
b	Use technical vocabulary suitable to the task and level of the person
c	Determine the appropriate amount of information to communicate
d	Interpret figurative or idiomatic language by reference to its use in context
e	Follow highly detailed, step by step directions
f	Solicit feedback to confirm the accurate reception of the communication
g	Recognize when a low key, informal dialogue is suitable
h	Recognize when direct verbal commands are necessary
i	Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
j	Recognize when the situation will require a structured, preplanned method of presentation

39	BARRIERS
a	Recognize the need for clear, concise directions in order to avoid language or word meaning differences
b	Recognize personality factors and inter personal relationships that may exist
c	Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40	PRECAUTIONS
a	Use common knowledge to avoid hazards in order to prevent injury to self or equipment
b	Apply preventive measures prior to task performance to minimize any potential safety or security problem
c	Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41	RECOGNITION
a	Identify similarities and differences between and among objects
b	Use body language (motions, gestures, postures) to communicate or signal
c	Determine the presence of a defect or extent of damage
d	Match objects by size, shape, color and significant markings
e	Classify objects by size, shape, color and significant markings
f	Determine direction, duration, and intensity of sounds, sightings and smells
g	Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and numerals.
- Write numerals one through N in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater/less than a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit: whole or decimal.
- Round off a number to a specified place: whole or decimal.
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display read out.
- Recognize a "reading" from a gauge with color divisions.
- Recognize positive (+) and negative (-) denotation on a scale.
- Select band(s) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of required measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs.
- Relate geometric symbols and graphic representations to actual systems, subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TECHNOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT HEADING

VISUAL AIDS

NT

25 PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are located within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29 ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30 FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31 SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33 NOTE TAKING

- Distinguish between essential and non essential details during the task or process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine upcoming points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, commas, and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ☒ a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing - communicating final instructions to others or giving an account in summary
- ☒ g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- ☒ a Enunciate clearly, using the proper rate of speech
- ☒ b Use technical vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step by step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low key, informal dialogue is suitable
- ☒ h Recognize when direct verbal commands are necessary
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39 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and inter personal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (motions, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

4/23/82

BSEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through **N** in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/less than a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, tens, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

6. GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8. PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- ✓ ☐ a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- ✓ ☐ a Identify technical words associated with geometric figures
- ✓ ☐ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- ✓ ☐ a Add or subtract whole numbers, without carrying or borrowing
- ✓ ☐ b Add or subtract whole numbers, carrying and borrowing
- ✓ ☐ c Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
- ✓ ☐ d Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution
- ✓ ☐ e Add or subtract to find correct time (24 hr clock) using hours or minutes
- ✓ ☐ f Add or subtract various increments on gauges, dials, or any other measuring instrument
- ✓ ☐ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- ✓ ☐ h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- ✓ ☐ a Multiply and divide whole numbers
- ✓ ☐ b Multiply and divide mixed numbers (whole and decimals)
- ✓ ☐ c Divide a number with decimals in both divisor and dividend
- ✓ ☐ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- ✓ ☐ e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- ✓ ☐ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- ✓ ☐ b Reduce fractions to lowest terms
- ✓ ☐ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- ✓ ☐ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- ✓ ☐ e Add and subtract fractions, with same or different denominators
- ✓ ☐ f Multiply and divide fractions with and without whole numbers
- ✓ ☐ g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- ✓ ☐ a Draw geometric figures, plane and solid
- ✓ ☐ b Match geometric figures with word names, equivalent measures
- ✓ ☐ c Label all parts of geometric figures using mathematical and characteristic designators
- ✓ ☐ d Use a protractor to measure angles, make geometrical constructions
- ✓ ☐ e Construct perpendicular on a line segment, bisector of an angle
- ✓ ☐ f Compute the perimeter and area of any figure
- ✓ ☐ g Compute the circumference and area of a circle
- ✓ ☐ h Compute the area and volume of any solid figure
- ✓ ☐ i Use formulas in solving problems involving geometric figures
- ✓ ☐ j Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- ✓ ☐ a Identify median and mode
- ✓ ☐ b Compute averages
- ✓ ☐ c Solve problems combining all processes using whole, mixed numbers and fractions
- ✓ ☐ d Solve problems, combining all processes, involving units of measurement
- ✓ ☐ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- ✓ ☐ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
- ✓ ☐ g Solve problems involving ratio and proportion
- ✓ ☐ h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- ✓ ☐ a Identify coordinates of a point in any grid system
- ✓ ☐ b Identify points on a line graph
- ✓ ☐ c Match a graph with its equation

18 ALGEBRA

- ✓ ☐ a Solve simple algebraic equations with one unknown
- ✓ ☐ b Recognize and derive equivalent algebraic expressions
- ✓ ☐ c Evaluate powers and estimate roots

19 TRIGONOMETRY

- ✓ ☐ a Use tables of trigonometric functions
- ✓ ☐ b Use tables of logarithms to solve problems
- ✓ ☐ c Solve geometric problems using trigonometric functions
- ✓ ☐ d Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine after scanning or skimming reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions or for locating a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components before and to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the task taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (map or sketch)

- ☒ a. Distinguish between major and subordinate topics
☒ b. Generate ideas for each major topic selected
☒ c. Use phrases or sentences to provide subordinate details under each major topic
☒ d. Alternate indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- ☒ a. State the intent or object (verb) of the report
☒ b. Describe the parameters of the event or situation
☒ c. Distinguish between relevant and irrelevant details
☒ d. Sequence events in the order they have occurred
☒ e. State general impressions of events described
☒ f. Select examples that will clarify major issues presented in the report
☒ g. Examine opposing points of view in the report
☒ h. Summarize the major points developed in the report
☒ i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- ☒ a. Spell frequently used words correctly
☒ b. Spell task related words correctly
☒ c. Identify words that need to be capitalized
☒ d. Correct all misspelled words with or without the use of a reference source
☒ e. Apply all rules for end marks, commas and apostrophes
☒ f. Apply common rules of grammar
☒ g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
☒ h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- ☒ a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
☒ b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
☒ c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
☒ d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
☒ e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
☒ f. Briefing - communicating final instructions to others or giving an account in summary
☒ g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
☒ h. Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38. CHARACTERISTICS

- ☒ a. Enunciate clearly, using the proper rate of speech
☒ b. Use technical vocabulary suitable to the task and level of the person
☒ c. Determine the appropriate amount of information to communicate
☒ d. Interpret figurative or idiomatic language by reference to its use in context
☒ e. Follow highly detailed, step by step directions
☒ f. Solicit feedback to confirm the accurate reception of the communication
☒ g. Recognize when a low key, informal dialogue is suitable
☒ h. Recognize when direct verbal commands are necessary
☒ i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
☒ j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- ☒ a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
☒ b. Recognize personality factors and inter personal relationships that may exist
☒ c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- ☒ a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
☒ b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
☒ c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- ☒ a. Identify similarities and differences between and among objects
☒ b. Use body language (motions, gestures, postures) to communicate or signal
☒ c. Determine the presence of a defect or extent of damage
☒ d. Match objects by size, shape, color and significant markings
☒ e. Classify objects by size, shape, color and significant markings
☒ f. Determine direction, duration, and intensity of sounds, sightings and smells
☒ g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

4/23/82

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar events and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Calculate time into, hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Calculate time using Greenwich Mean Time (GMT) as a basis for establishing hours and 15 minutes |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles with the corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

13. SOLIDS

- Recognize and label the names of solids with their corresponding figures

14. TERMINOLOGY

- Identify technical words associated with geometric figures
- Interpret a map of a being derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- Add or subtract whole numbers without carrying or borrowing
- Add or subtract whole numbers carrying and borrowing
- Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
- Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution
- Add or subtract to find correct time (24 hr clock) using hours or minutes
- Add or subtract various increments on gauges, dials, or any other measuring instrument
- Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- Multiply and divide whole numbers
- Multiply and divide mixed numbers (whole and decimals)
- Divide a number with decimals in both divisor and dividend
- Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- Estimate a product or quotient

14. FRACTIONS/DECIMALS

- Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- Reduce fractions to lowest terms
- Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- Add and subtract fractions with same or different denominators
- Multiply and divide fractions with and without whole numbers
- Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- Draw geometric figures, plane and solid
- Match geometric figures with word names, equivalent measures
- Label all parts of geometric figures using mathematical and characteristic designations
- Use a protractor to measure angles, make geometrical constructions
- Construct perpendicular on a line segment, bisector of an angle
- Compute the perimeter and area of any figure
- Compute the circumference and area of a circle
- Compute the area and volume of any solid figure
- Use formulas in solving problems involving geometric figures
- Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- Identify median and mode
- Compute averages
- Solve problems combining all processes using whole, mixed numbers and fractions
- Solve problems, combining all processes, involving units of measurement
- Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- Solve problems involving ratio and proportion
- Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- Identify coordinates of a point in any grid system
- Identify points on a line graph
- Match a graph with its equation

18. ALGEBRA

- Solve simple algebraic equations with one unknown
- Recognize and derive equivalent algebraic expressions
- Evaluate powers and estimate roots

19. TRIGONOMETRY

- Use tables of trigonometric functions
- Use tables of logarithms to solve problems
- Solve geometric problems using trigonometric functions
- Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify the full details or specifications that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task actively following highly detailed step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Locate a fact or specification from a two column table or chart to find information.
- Locate a fact or specification from an intersection of a row by column table or chart.
- Locate a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apprehend information from tables and charts for locating malfunctions or for writing a course of action.

NT

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34. UNDERSTANDING SHAPES AND RELATIONS

- Describe the relationship between major and subordinate topics
- Generate ideas for each major topic selected
- Use primary techniques to provide subordinate details under each major topic
- Alternate use of numbers and letters to establish a hierarchy

35. REPORT WRITING

- State the intent or scope of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- Spell frequently used words correctly
- Spell task related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step by step directions
- Select feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

1. *What is the difference between a positive and a negative number?*
 2. *What is the difference between a positive and a negative integer?*
 3. *What is the difference between a positive and a negative rational number?*
 4. *What is the difference between a positive and a negative real number?*
 5. *What is the difference between a positive and a negative complex number?*
 6. *What is the difference between a positive and a negative imaginary number?*
 7. *What is the difference between a positive and a negative real number?*
 8. *What is the difference between a positive and a negative rational number?*
 9. *What is the difference between a positive and a negative integer?*
 10. *What is the difference between a positive and a negative number?*

UNITS OF MEASUREMENT

LINEAR WEIGHT AND VOLUME MEASURES

<input checked="" type="checkbox"/>	a	Name the markings on a linear scale
<input checked="" type="checkbox"/>	b	Differentiate units of measure and equivalents in the English
<input checked="" type="checkbox"/>	c	Use a ruler, yardstick, meter stick or scale to measure lengths
<input checked="" type="checkbox"/>	d	Identify measures of ounce, pound, gram
<input checked="" type="checkbox"/>	e	Identify measures of pints, quarts, gallons, liters
<input checked="" type="checkbox"/>	f	Use a scale which is not numerically calibrated
<input checked="" type="checkbox"/>	g	Estimate measures of varying lengths, dimensions or weights

3. LIFE-THREAT MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearing, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

A T.M. TELLING MEASURES

	Use a 24-hour digital clock to tell time	Name intervals and tell time in hours, minutes, and seconds
a	Estimate time in seconds, minutes, and parts of an hour	Estimate time in seconds, minutes, and parts of an hour
b	Order by cardinality and arrange objects in a linear style	Order by cardinality and arrange objects in a linear style
c	Classify objects by size, shape, weight, length, and color	Classify objects by size, shape, weight, length, and color
d	Classify objects by color, shape, weight, length, and color	Classify objects by color, shape, weight, length, and color

6. LARGE MEASURES

<input checked="" type="checkbox"/>	a	Identify the unit of measurement (found on dial) which interprets the number with symbol from a display read-out
<input checked="" type="checkbox"/>	b	Recognize a "reading" from a gauge with color displays
<input checked="" type="checkbox"/>	c	Recognize positive (+) and negative (-) deflection on a scale
<input checked="" type="checkbox"/>	d	Select (band/s) from a multi-scale gauge
<input checked="" type="checkbox"/>	e	Match a gauge reading to a specification using numbered or colored intervals
<input checked="" type="checkbox"/>	f	Interpret gauge readings that are unnumbered/unmarked intervals
<input checked="" type="checkbox"/>	g	Interpret a gauge reading which is less than or more than sustained
<input checked="" type="checkbox"/>	h	Match specifications of required measures by manipulation, alignment or maintenance

VISUAL SPATIAL RELATIONSHIPS

6. SPATIAL

a	Identify directions that tools, hardware, or components may be moved	<input checked="" type="checkbox"/>
b	Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle	<input checked="" type="checkbox"/>
c	Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs	<input checked="" type="checkbox"/>
d	Relate geometric symbols and graphic representations to actual systems, subsystems, and components	<input type="checkbox"/>

GEOMETRY

7 LINES

☒ a Identify and name points, lines, rays, and segments
☒ b Identify intersecting lines, parallel lines, and line segments
☒ c Define and identify perpendicular lines
☒ d Identify congruent segments

18 PLANES

<input checked="" type="checkbox"/>	a	Identify and name plane geometric figures
<input checked="" type="checkbox"/>	b	List the characteristics of geometric figures
<input checked="" type="checkbox"/>	c	Classify figures according to the number or measure of its sides or angles
<input checked="" type="checkbox"/>	d	Identify figures which possess similarities
<input checked="" type="checkbox"/>	e	Identify figures which may be parallel, perpendicular or congruent

19 ANGLES AND TRIANGLES

☒ a Identify and name the different kinds of angles and triangles, with their corresponding figures
☒ b Identify vertical, adjacent, complementary or supplementary angles
☒ c Classify triangles according to their sides or angle size
☒ d Identify altitudes and medians of triangles or the bisector of an angle
☒ e Name an angle by using writers, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves, fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures: plane and solid
b. Match geometric figures with word names: equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles; make geometric constructions
e. Construct perpendicular on a line segment; bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Use formulas in solving problems involving geometric figures
i. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

254

100

- Journal of Management Studies*, 1986, 23(1), 7-10.

3.3.3 FLOW CHARTS

6. Use a jump packet if you think the person you are visiting does not have a procedure to arrive at day in prison, and to be released, after the PAF is problem-solving.

7. SCHEMATICS

7. SCHEMATICS

- | | | |
|---|---|--|
| a | ✓ | Isolate each major section or entry to be covered in a schematic diagram. |
| b | ✓ | Identify the components within each entry. |
| c | ✓ | Track connections in an entry used to point from their origin to another point within or from one entity to another. |
| d | ✓ | Isolate a problem component in a schematic and trace it to components likely to cause the problem. |
| e | ✓ | Interpret symbols to indicate direction of flow, test points, components, and thermodynamic decision points. |

22 50803

- | | | |
|---|----|---|
| ✓ | a. | Locate the block on a form to enter the appropriate information. |
| ✓ | b. | Transfer a number, order, date, figure or related data from supporting written sources onto an appropriate section of the form. |
| ✓ | c. | Write the name of the organization, responsible personnel, location of the part or equipment, and manufacture, in appropriate sections of the form. |
| ✓ | d. | Write a descriptive account of an activity or transaction performed. |
| ✓ | e. | Use a recorded account to locate or retrieve information. |

NT

34 OUTLINING (topic or sentence)

- | | | |
|---|---|---|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate ideas for each major topic selected (the phrases or sentences to provide subordinate details under each major topic) |
| ✓ | c | |
| ✓ | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task-related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas, and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|---|---|---|
| ✓ | a | Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instructor a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Tutor interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | peer Group (less than 10) all members engage in an activity which one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Inter view a person communicating with another about his activities opinions or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing communicating final instructions to others or giving an account in summary |
| ✓ | g | Counsel communicating together to exchange ideas of opinions to recommend give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command communicating to others an order or action, to be taken where a person has a position of authority |

4/23/82

NT

38 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
| ✓ | c | Determine the appropriate amount of information to communicate |
| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed step-by-step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low-key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal commands are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| ✓ | b | Recognize personality factors and inter personal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|--|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smell, or tastes to determine a course of action |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers in lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic notations
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

3) RECOGNITION

1. Identify the need for recognition
2. Select the appropriate recognition method
3. Apply the recognition method
4. Evaluate the results
5. Adjust the method as needed
6. Document the results
7. Report the results
8. Review the results
9. Update the method as needed
10. Repeat the process

4) RECOGNITION

- a. Identify the need for recognition
- b. Select the appropriate recognition method
- c. Apply the recognition method
- d. Evaluate the results
- e. Adjust the method as needed
- f. Document the results
- g. Report the results
- h. Review the results
- i. Update the method as needed
- j. Repeat the process

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

VERBAL COMMUNICATION

3) TYPE

- a. Inform - a person working on a task and communicating with another when substance is needed or when a supervisory decision is needed
- b. Instruct - a task activity requiring communication between an instructor or an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Interact - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Participate - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Advise - a person communicating with another about his activities, actions, or subject matter for the purpose of using the information
- f. Communicate - communicating first, then, then to others, giving an action
- g. Coordinate - communicating together to exchange ideas or opinions to reach a common goal or to arrive at an acceptable plan or decision
- h. Communicate - to others an order or direction to be taken where the order is a part of action

3) RECOGNITION

1. Identify the need for recognition
2. Select the appropriate recognition method
3. Apply the recognition method
4. Evaluate the results
5. Adjust the method as needed
6. Document the results
7. Report the results
8. Review the results
9. Update the method as needed
10. Repeat the process

4) RECOGNITION

- a. Identify the need for recognition
- b. Select the appropriate recognition method
- c. Apply the recognition method
- d. Evaluate the results
- e. Adjust the method as needed
- f. Document the results
- g. Report the results
- h. Review the results
- i. Update the method as needed
- j. Repeat the process

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

4) RECOGNITION

- a. Identify similarities and differences between and among objects to signal
- b. Use body language (motions, gestures, postures) to communicate
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant marking
- e. Classify objects by size, shape, color and significant marking
- f. Determine direction, duration, and intensity of sounds, sight, or smell
- g. Infer from sight, sound, touch, smell, or taste to determine a course of action

CONTENT READING

NT

29. PROCEEDURAL DIRECTIONS

- Identify facted details or specifications that are found within a statement or written action
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Discern the main idea or message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

30. VOCABULARY

- Recognize and understand word and their meanings
- Use ignore technical words with technical meanings
- Identify the meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using a reference source

INFORMATION ACCESS

31. REFERENCE SKILLS

- Locate a Technical Abstract, Field Manual or any related source document by code number and title
- Appropriate use of topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to obtain information
- Locate the page, table, paragraph, figure or chart needed to answer a question or to solve a problem
- Determine when skimming or skimming reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a task
- Organize information from multiple sources into a sequential series of steps

32. TABLES

- Read and understand the information presented in a table
- Interpret the information presented in a table
- Use the information presented in a table to solve a problem
- Use the information presented in a table to make a decision
- Use the information presented in a table to make a prediction
- Use the information presented in a table to make a comparison
- Use the information presented in a table to make a contrast
- Use the information presented in a table to make a conclusion

NT

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of an object for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order in a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a single linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- Translate the significance of the symbols into physical actions

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, measurements and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from a statement or written source onto an appropriate section of the form
- Complete a form using appropriate information
- Use the information on a form to make a decision
- Use the information on a form to make a prediction
- Use the information on a form to make a comparison
- Use the information on a form to make a contrast
- Use the information on a form to make a conclusion

33. NOTES

- Read and understand the information presented in a note
- Interpret the information presented in a note
- Use the information presented in a note to solve a problem
- Use the information presented in a note to make a decision
- Use the information presented in a note to make a prediction
- Use the information presented in a note to make a comparison
- Use the information presented in a note to make a contrast
- Use the information presented in a note to make a conclusion

- ### UNITS OF MEASUREMENT

LINEAR WEIGHT AND VOLUME MEASURES

- DEGREE MEASURES

- ### TIME TRAINING MEASURES

2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841.

LAURENCE A. BENTLEY

- # VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- ## RECAPITULATORY

SEN & JONES

- 19 D: ANES

- ## 1.9 ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of the base of a triangle.
- Name an acute, an obtuse, a right, an isosceles, an equilateral, a scalene triangle.

SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

TERMINOLOGY

- a. Identify technical word is associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and/or subtract decimals and carrying with mixed numbers

(When adding or subtracting, the student is to use a number line to

illustrate the process.)

(When subtracting, the student is to use a number line to illustrate the

process.)

(When adding or subtracting, the student is to use a number line to

illustrate the process.)

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illustrate the process.)

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process.)

(When adding or subtracting, the student is to use a number line to

illustrate the process.)

GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designations
- d. Use a protractor to measure angles, make geometric constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

COMBINATION OF PROCESSES

- a. Identify motion and needs
- b. Compute averages
- c. Solve problems representing all four operations, including mixed numbers
- d. Compute angles, including complementary, supplementary, adjacent angles
- e. Compute perimeter, area, and volume
- f. Compute circumference and area of a circle
- g. Compute area and volume of any solid figure
- h. Use formulas in solving problems involving geometric figures
- i. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

ALGEBRA

- a. Solve simple algebraic equations, including unknowns
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of functions to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric values to solve problems

ND-A143 593

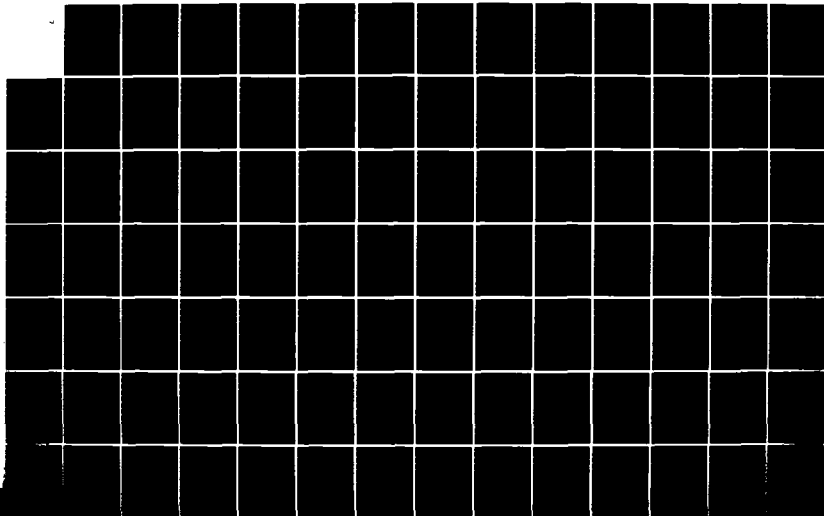
NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

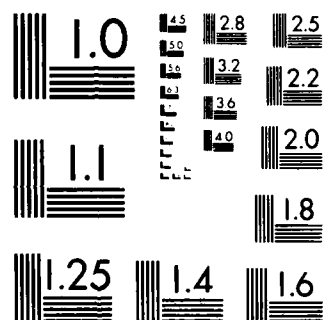
677

UNCLASSIFIED

F/G 5/9

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

NT

34 OUTLINING (topic or sentence)

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentence for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/73/82

NT

38 CHARACTERISTICS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low-key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and interpersonal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sound, sights and smells |
| <input checked="" type="checkbox"/> | g | Infer from sight, sound, touch, smell, or taste to determine a course of action |

NUMERATION/PLACE VALUE

NT

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through 10 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less from a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pint, quart, gallon, liter |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read-out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select handle from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or nonuniformly sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designations
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEEDURAL DIRECTIONS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify factual details or specifications that are found within a statement or written selection |
| <input checked="" type="checkbox"/> | b. Select parts of text and visual materials to complete a task activity |
| <input checked="" type="checkbox"/> | c. Follow highly detailed step by step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d. Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e. Infer from a written source, which does not explicitly provide required information, in order to make a decision |
| <input checked="" type="checkbox"/> | f. Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b. Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c. Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d. Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Locate a Technical Manual, Field Manual or any related source document by code number and title |
| <input checked="" type="checkbox"/> | b. Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| <input checked="" type="checkbox"/> | e. Determine, after scanning or skimming, whether the information is relevant |
| <input checked="" type="checkbox"/> | f. Cross-reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g. Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Obtain a fact or specification from a two column table or chart to find information |
| <input checked="" type="checkbox"/> | b. Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart |
| <input checked="" type="checkbox"/> | d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action |

4/23/82

VISUAL AIDS

NT

29. ILLUSTRATIONS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b. Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d. Interpret a three dimensional projection or exploded view of object (s) for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e. Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f. Integrate information from various sources to select a course of action |

30. FLOW CHARTS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving |
| <input checked="" type="checkbox"/> | c. Translate the significance of the symbols into physical activities |

31. SCHEMATICS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Isolate each major section or entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b. Identify the components within each entity |
| <input checked="" type="checkbox"/> | c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d. Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b. Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form |
| <input checked="" type="checkbox"/> | d. Write a descriptive account of an activity or transaction performed |
| <input checked="" type="checkbox"/> | e. Use a completed form to locate or compare information |

33. NOTE-TAKING

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between essential and non-essential details during the note taking process |
| <input checked="" type="checkbox"/> | b. Record details without misinterpreting the intent of either written material or an interview |
| <input checked="" type="checkbox"/> | c. Revise all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d. Organize all sentences into paragraphs |

34. OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

38. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interject figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word-matching difference |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter-personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models. |
| <input checked="" type="checkbox"/> | b. Write numerals one through 10 in sequential order from any starting point. |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals. |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals. |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position. |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal. |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal. |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting). |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values). |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale. |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system. |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances. |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram. |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters. |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated. |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights. |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature. |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180°. |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils. |

4. TIME-TELLING MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Use a 24-hour or digital clock to tell time. |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds. |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour. |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style. |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hour. |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances. |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument. |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out. |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions. |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale. |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge. |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals. |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval. |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained. |
| <input checked="" type="checkbox"/> | i. Match specifications of required measure by manipulation, alignment or maintenance. |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved. |
| <input checked="" type="checkbox"/> | b. Manipulate objects to elige, match, mate, make parallel, be perpendicular or be at an angle. |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs. |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components. |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments. |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments. |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines. |
| <input checked="" type="checkbox"/> | d. Identify congruent segments. |

8. PLANES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures. |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures. |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles. |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities. |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent. |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures. |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles. |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size. |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle. |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter. |

NT

110. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) length, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

NT

25. PROCDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contribute to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for performing a course of action

4/23/82

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Reverse all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low-key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal comments are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter-personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

8SEP1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b | Write numerals one through 9 in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit: whole or decimal number |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place: whole or decimal |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e | Identify measures of pint, quart, gallon, liters |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contents in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use a 24-hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f | Calculate time using Greenwich Mean Time (GMT) as a basis for establishing time and distances |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read-out |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numerical or labeled intervals |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular to, be at an angle |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d | Identify congruent segments |

8. PLANES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles with their corresponding figures |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recapture and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADINGS

NI

26. VOCABULARY

- Know the definitions of words and symbols that are used in technical documents.
- Select parts of text and visual material to complete a task activity.
- Follow a fully detailed step-by-step direction in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

27. INFORMATION ACCESS

- Use office notation search and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

28. TABLES/CHARTS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Associate words or topics to locate information.
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine after scanning or skim-reading, whether the information is relevant.
- Cross-reference within and across source documents to select information needed to perform a function.
- Organize information from multiple sources into a sequenced series of events.

29. FLOW CHARTS

- Interpret a flow chart or specification from a line, column table or chart to find information.
- Interpret a flow chart or specification from an integrated flow chart to find information.
- Interpret a flow chart or specification from a line, column table or chart to find information.
- Interpret a flow chart or specification from an integrated flow chart to find information.

40 and 4

VISUAL AIDS

NI

30. FLOW CHARTS

- Interpret a flow chart or specification from a line, column table or chart to find information.
- Interpret a flow chart or specification from an integrated flow chart to find information.
- Interpret a flow chart or specification from a line, column table or chart to find information.
- Interpret a flow chart or specification from an integrated flow chart to find information.

31. FLOW CHARTS

- Use a single linear path of an organizational chart to list events in a given time order.
- Use a linear path of a flow chart to provide actual and logical direction to a task activity, to arrive at decision points, and to provide alternative paths in problem-solving.
- Translate the significance of the symbols into physical activities.

32. SCHEMATICS

- Isolate each major section or entity presented in a schematic that is to be interpreted.
- Identify the components within each entity.
- Trace each network in an integrated flow from their origin to end point, within or from one entity to another.
- Isolate a problem component in a schematic and trace it to consider its function.
- Interpret symbols to indicate direction of flow, test points, control elements and diagrammatic decision points.

WRITTEN COMMUNICATION

33. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from source material to a form.
- Write the name of the organization, responsible personnel, department, post or equipment, and numerical value, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

34. NOTE TAKING

- Distinguish between essential and non-essential details during fact-finding process.
- Record details without misinterpreting the intent of either written or oral information.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34. OUTLINING (topic or sentence)

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b | Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c | Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d | Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b | Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c | Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d | Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e | State general impressions of events described |
| <input checked="" type="checkbox"/> | f | Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g | Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h | Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i | Justify an action taken and give reasons for selecting alternatives |

36. EDITING

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b | Spell task related words correctly |
| <input checked="" type="checkbox"/> | c | Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d | Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e | Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f | Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f | Briefing - communicating final instructions to officers or giving an account in summary |
| <input checked="" type="checkbox"/> | g | Confer - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an objective of a plan or decision |
| <input checked="" type="checkbox"/> | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38. CHARACTERISTICS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b | Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c | Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d | Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e | Follow highly detailed step by step directions |
| <input checked="" type="checkbox"/> | f | Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g | Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h | Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j | Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b | Recognize personality factors and interpersonal relationships that may exist |
| <input checked="" type="checkbox"/> | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b | Apply preventive measures prior to task performance to minimize any potential safety or security problems |
| <input checked="" type="checkbox"/> | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b | Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c | Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d | Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e | Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

NUMERATION VALUE

NT

1. FORMS, FIGS, AND COUNTING

- Match numerals with word names and models.
- Write numerals one through 9 in sequential order from any starting point.
- State what numeral comes after, before or between any two given numerals.
- Select the numeral which is greater/less from a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit, whole or decimal number.
- Round off a number to a specified place, whole or decimal.
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR WEIGHT AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects in distance.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances.

4/23/82

NT

5. SPATIAL MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display readout.
- Recognize a "reading" from a gauge with cubic divisions.
- Recognize positive (+) and negative (-) denotation on a scale.
- Select (band(s)) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of required measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify and name tools that tools, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs.
- Relate pictorial symbols and graphic representations to actual systems, subsystems and components.

GEOME. 4V

7. LINES

- Identify and name points, lines, rays and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

NT

| | | |
|----|--|--|
| 30 | Flow charts, organizational charts, and other diagrams | Identify details, labels, numbers, and parts from an illustration or picture |
| 31 | Flow charts, organizational charts, and other diagrams | Identify parts or details according to a key or legend |
| 32 | Flow charts, organizational charts, and other diagrams | Interpret a drawing which shows a time sequence or view of an object for assembly/disassembly |
| 33 | Flow charts, organizational charts, and other diagrams | Interpret a three-dimensional projection or expanded view of object for assembly/disassembly or position in system or sub-system |
| 34 | Flow charts, organizational charts, and other diagrams | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| 35 | Flow charts, organizational charts, and other diagrams | Integrate information from various sources to select a course of action |

| | | |
|----|------------|--|
| 36 | Vocabulary | Recognize common words and their meanings |
| 37 | Vocabulary | Recognize task-related words with technical meanings |
| 38 | Vocabulary | Identify the correct meaning of a word from the context of a sentence |
| 39 | Vocabulary | Recognize the meaning of common contractions, abbreviations and acronyms |
| 40 | Vocabulary | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

| | | |
|----|------------------|---|
| 41 | Reference Skills | Locate a Technical Manual, Field Manual, or any related source document by code number and title |
| 42 | Reference Skills | Alphabetize words or topics to locate information |
| 43 | Reference Skills | Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information |
| 44 | Reference Skills | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| 45 | Reference Skills | Determine, after scanning or skimming, whether the information is relevant |
| 46 | Reference Skills | Use reference within and across source documents to select information needed to perform a routine |
| 47 | Reference Skills | Organize information from multiple sources into a sequenced series of events |

| | | |
|----|---------------|---|
| 48 | Tables/Charts | Obtain a fact or specification from a two-column table or chart to find information |
| 49 | Tables/Charts | Obtain a fact or specification from an intersection of a row by column table or chart |
| 50 | Tables/Charts | Obtain a complex table or chart requiring cross-referencing within or in combination with text material outside the chart |
| 51 | Tables/Charts | Apply information from tables and charts for locating malfunction(s) or for selecting a course of action |

NT

| | | |
|----|--|--|
| 52 | Flow charts, organizational charts, and other diagrams | Identify details, labels, numbers, and parts from an illustration or picture |
| 53 | Flow charts, organizational charts, and other diagrams | Identify parts or details according to a key or legend |
| 54 | Flow charts, organizational charts, and other diagrams | Interpret a drawing which shows a time sequence or view of an object for assembly/disassembly |
| 55 | Flow charts, organizational charts, and other diagrams | Interpret a three-dimensional projection or expanded view of object for assembly/disassembly or position in system or sub-system |
| 56 | Flow charts, organizational charts, and other diagrams | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| 57 | Flow charts, organizational charts, and other diagrams | Integrate information from various sources to select a course of action |

| | | |
|----|--|--|
| 58 | Flow charts, organizational charts, and other diagrams | Use a simple linear path of an organizational chart to list events in sequential order |
| 59 | Flow charts, organizational charts, and other diagrams | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving |
| 60 | Flow charts, organizational charts, and other diagrams | Translate the significance of the symbols into physical action |

| | | |
|----|------------|--|
| 61 | Schematics | Isolate each major section or entity presented in a schematic diagram |
| 62 | Schematics | Identify the components within each entity |
| 63 | Schematics | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| 64 | Schematics | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| 65 | Schematics | Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points |

WRITTEN COMMUNICATION

| | | |
|----|-------|--|
| 66 | Forms | Locate the block on a form to enter the appropriate information |
| 67 | Forms | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| 68 | Forms | Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature, in appropriate sections of the form |
| 69 | Forms | Write a descriptive account of an activity or transaction performed |
| 70 | Forms | Use a completed form to locate or compare information |

| | | |
|----|-------------|--|
| 71 | Note Taking | Distinguish between essential and non-essential details during the note-taking process |
| 72 | Note Taking | Record details without misinterpreting the intent of either written material or an interview |
| 73 | Note Taking | Rewrite all recorded details in sentence form |
| 74 | Note Taking | Organize all sentences into paragraphs |

NT

34 OUTLINING (topic or sentence)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for reflecting alternatives

36 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task-related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, commas and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ☒ a Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instruction a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Tutor interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview a person communicating with another about his activities, impressions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing communicating final mission tasks to others or giving an account in summary
- ☒ g Consult communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an explanation of a plan or decision
- ☒ h Command communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ☒ a Enunciate clearly, using the proper rate of speech
- ☒ b Use technique of vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step by step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low key, informal dialogue is suitable
- ☒ h Recognize when direct verbal commands are necessary
- ☒ i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and interpersonal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (motions, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, lightings and smells
- ☒ g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- ☒ h Interpret Codes & Symbols

BSPT

NUMERATION PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models. |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>9</u> in sequential order from any starting point. |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals. |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less than a set of numerals. |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position. |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit within a decimal number. |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place value to the nearest. |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, etc. backward or forward (skip counting). |
| <input checked="" type="checkbox"/> | i | Match numbers with points on a number line (positive (+) or negative (-) values). |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale. |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system. |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances. |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram. |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters. |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated. |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights. |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify degree or mil as a unit in determining direction, distance or temperature. |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° . |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils. |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Use a 24-hour or digital clock to tell time. |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds. |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour. |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style. |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tenths of hours. |
| <input checked="" type="checkbox"/> | f | Convert time using Greenwich Mean Time (GMT) as a basis for establishing time zones and time differences. |

NT

5. GAUGE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument. |
| <input checked="" type="checkbox"/> | b | Interpret the number word, symbol from a display read out. |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with color divisions. |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) deflection on a scale. |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi-scale gauge. |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals. |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unlabeled interval. |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained. |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance. |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved. |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle. |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs. |
| <input checked="" type="checkbox"/> | d | Match geometric symbols and graphic representations to actual systems, subsystems and components. |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments. |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments. |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines. |
| <input checked="" type="checkbox"/> | d | Identify congruent segments. |

8. PLANES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures. |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures. |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles. |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities. |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent. |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles, with their corresponding figures. |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary or supplementary angles. |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or anglesize. |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the bisector of an angle. |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a number, or a single letter. |

4/23/82

NT

10 SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11 TECHNOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b Find fractions in lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

118 ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

119 TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT HEADING

VISUAL AIDS

NT

29. PROCEDURAL DIRECTIONS

- Identify functional steps or specifications that are found within a statement or written direction
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Inter from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

30. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

37. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or other related source document by code number and title
- Alphabetize words or figures to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure or chart needed to answer a question or to solve a problem
- Determine after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequential series of events

38. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a diagram, table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for determining a sequence of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the blank on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

14 OUTLINING (begin on sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate indent numbers and letters to establish a hierarchy

15 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instructor a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f Briefing communicating final instructions to others or giving an account in summary
- g Counsel communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command communicate to others in order of action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step-by-step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a feedback, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1. ROUNDING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 9 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/lessor from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit: whole or decimal number
- Round off a number to a specified place: whole or decimal
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system: Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Find time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing time zones

4-217

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color display
- Recognize positive (+) and negative (-) deflection on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using rounded or labeled intervals
- Interpret gauge readings from an unmarked/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, containing all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTINUED READING

NT

| | | |
|----|------------------|---|
| 25 | ILLUSTRATIONS | Identify factors, details, or specific items that are included within a statement or within a section. |
| 26 | VOCABULARY | Recognize common words and their meanings. |
| 27 | REFERENCE SKILLS | Locate a Technical Manual, Field Manual or any related source document by code number and title. |
| 28 | TABLES/CHARTS | Use a table of contents, index, system or sub-system heading, appendix or glossary to locate information. |
| 29 | SCHEMATICS | Isolate each major section or entity presented in a schematic diagram. |
| 30 | FLOW CHARTS | Use a simple linear path of an organizational chart to list names in order. |
| 31 | SCHEMATICS | Isolate each major section or entity presented in a schematic diagram. |
| 32 | FORMS | Locate the block on a form to enter the appropriate information. |
| 33 | NOTE-TAKING | Distinguish between essential and non-essential details drawn from a process. |

26 VOCABULARY

| | |
|---|---|
| 1 | Recognize common words and their meanings. |
| 2 | Recognize task-related words with technical meanings. |
| 3 | Identify the correct meaning of a word from the context of a sentence. |
| 4 | Recognize the meaning of common contractions, abbreviations and acronyms. |
| 5 | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s). |

INFORMATION ACCESS

27 REFERENCE SKILLS

| | |
|---|---|
| 1 | Locate a Technical Manual, Field Manual or any related source document by code number and title. |
| 2 | Use the table of contents, index, system or sub-system heading, appendix or glossary to locate information. |
| 3 | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem. |
| 4 | Determine, after scanning or skim-reading, whether the information is relevant. |
| 5 | Cross-reference within and across source documents to select information needed to perform a routine. |
| 6 | Organize information from multiple sources into a sequenced series of events. |

28 TABLES/CHARTS

| | |
|---|---|
| 1 | Use a table or specification from a two-column table or chart to find information. |
| 2 | Obtain a fact or specification from an intersection of a row by column label or title. |
| 3 | Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart. |
| 4 | Apply information from tables and charts for locating malfunctions or for which a remedy is sought. |

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VISUAL AIDS

NT

| | | |
|----|---------------|---|
| 29 | ILLUSTRATIONS | Identify details, labels, numbers, and parts from illustrations. |
| 30 | FLOW CHARTS | Use a simple linear path of an organizational chart to list names in order. |
| 31 | SCHEMATICS | Isolate each major section or entity presented in a schematic diagram. |
| 32 | FORMS | Locate the block on a form to enter the appropriate information. |
| 33 | NOTE-TAKING | Distinguish between essential and non-essential details drawn from a process. |

30 FLOW CHARTS

| | |
|---|---|
| 1 | Use a simple linear path of an organizational chart to list names in order. |
| 2 | Use a linear path of a flow chart to provide visual and technical details to a procedure, to arrive at decision points, and to provide appropriate feedback in problem solving. |
| 3 | Translate the significance of the symbols into physical activity. |

31 SCHEMATICS

| | |
|---|---|
| 1 | Isolate each major section or entity presented in a schematic diagram. |
| 2 | Identify the components within each entity. |
| 3 | Trace connections in an integrated circuit from their origin to a load or to a problem. |
| 4 | Isolate a problem component in a schematic and trace it to a component or to a load. |
| 5 | Interpret symbols to indicate direction of flow, test points, control points, and diagrammatic decision points. |

WRITTEN COMMUNICATION

32 FORMS

| | |
|---|---|
| 1 | Locate the block on a form to enter the appropriate information. |
| 2 | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form. |
| 3 | Write the name of the organization, responsible personnel, unit, or equipment part or equipment, and nomenclature, in appropriate sections of the form. |
| 4 | Write a descriptive account of an activity or transaction past tense. |
| 5 | Use a completed form to locate or compare information. |

33 NOTE-TAKING

| | |
|---|--|
| 1 | Distinguish between essential and non-essential details drawn from a process. |
| 2 | Record details without misinterpreting the intent of either the speaker or the writer. |
| 3 | Rewrite all recorded details in sentence form. |
| 4 | Organize all sentences into paragraphs. |

NT

34 OUTLINING (Topic or Content)

- | | | |
|---|---|--|
| ✓ | a | Distinguish between major and subordinate topics |
| ✓ | b | Generate titles for each major topic selected |
| ✓ | c | Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d | Alternate indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

- | | | |
|---|---|--|
| ✓ | a | State the intent or objective(s) of the report |
| ✓ | b | Describe the parameters of the event or situation |
| ✓ | c | Distinguish between relevant and irrelevant details |
| ✓ | d | Sequence events in the order they have occurred |
| ✓ | e | State general impressions of events described |
| ✓ | f | Select examples that will clarify major issues presented in the report |
| ✓ | g | Examine opposing points of view in the report |
| ✓ | h | Summarize the major points developed in the report |
| ✓ | i | Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

- | | | |
|---|---|---|
| ✓ | a | Spell frequently used words correctly |
| ✓ | b | Spell task related words correctly |
| ✓ | c | Identify words that need to be capitalized |
| ✓ | d | Correct all misspelled words with or without the use of a reference source |
| ✓ | e | Apply all rules for end marks, commas and apostrophes |
| ✓ | f | Apply common rules of grammar |
| ✓ | g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h | Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

- | | | |
|---|---|--|
| ✓ | a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b | Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c | Forum - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| ✓ | f | Briefing - communicating final instructions to others or giving an account of summary |
| ✓ | g | Consult - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h | Command - communicate to others an order or action to be taken where a person has a position of authority |

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NT

38 CHARACTERISTICS

- | | | |
|---|---|--|
| ✓ | a | Enunciate clearly, using the proper rate of speech |
| ✓ | b | Use technical vocabulary suitable to the task and level of the person |
| ✓ | c | Determine the appropriate amount of information to communicate |
| ✓ | d | Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e | Follow highly detailed, step by step directions |
| ✓ | f | Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g | Recognize when a low-key, informal dialogue is suitable |
| ✓ | h | Recognize when direct verbal commands are necessary |
| ✓ | i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j | Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

- | | | |
|---|---|---|
| ✓ | a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| ✓ | b | Recognize personality factors and interpersonal relationships that may exist |
| ✓ | c | Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

- | | | |
|---|---|--|
| ✓ | a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b | Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c | Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41 RECOGNITION

- | | | |
|---|---|---|
| ✓ | a | Identify similarities and differences between and among objects |
| ✓ | b | Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c | Determine the presence of a defect or extent of damage |
| ✓ | d | Match objects by size, shape, color and significant markings |
| ✓ | e | Classify objects by size, shape, color and significant markings |
| ✓ | f | Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action |
| ✓ | h | Interpret Codes & Symbols |

NUMERICAL PLACE VALUE

NT

1. NUMBERS, AND COUNTING

- a. Match materials with word values and models
- b. Write numerals one through N in sequential order from any starting point
- c. Write numerals one through N in sequential order from any starting point
- d. Write numerals one through N in sequential order from any starting point
- e. Write numerals one through N in sequential order from any starting point
- f. Write numerals one through N in sequential order from any starting point
- g. Write numerals one through N in sequential order from any starting point
- h. Write numerals one through N in sequential order from any starting point
- i. Write numerals one through N in sequential order from any starting point
- j. Write numerals one through N in sequential order from any starting point
- k. Write numerals one through N in sequential order from any starting point
- l. Write numerals one through N in sequential order from any starting point
- m. Write numerals one through N in sequential order from any starting point
- n. Write numerals one through N in sequential order from any starting point
- o. Write numerals one through N in sequential order from any starting point
- p. Write numerals one through N in sequential order from any starting point
- q. Write numerals one through N in sequential order from any starting point
- r. Write numerals one through N in sequential order from any starting point
- s. Write numerals one through N in sequential order from any starting point
- t. Write numerals one through N in sequential order from any starting point
- u. Write numerals one through N in sequential order from any starting point
- v. Write numerals one through N in sequential order from any starting point
- w. Write numerals one through N in sequential order from any starting point
- x. Write numerals one through N in sequential order from any starting point
- y. Write numerals one through N in sequential order from any starting point
- z. Write numerals one through N in sequential order from any starting point

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Different are units of measure and equivalents in the English and metric systems
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects in distance
- d. Identify measures of units: pound, gram
- e. Identify measures of units: quart, quart, liter
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. LENGTH MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Estimate, compare, units and arrange them in Julian style
- e. Estimate, compare, units and arrange them in Julian style
- f. Estimate, compare, units and arrange them in Julian style
- g. Estimate, compare, units and arrange them in Julian style
- h. Estimate, compare, units and arrange them in Julian style
- i. Estimate, compare, units and arrange them in Julian style
- j. Estimate, compare, units and arrange them in Julian style
- k. Estimate, compare, units and arrange them in Julian style
- l. Estimate, compare, units and arrange them in Julian style
- m. Estimate, compare, units and arrange them in Julian style
- n. Estimate, compare, units and arrange them in Julian style
- o. Estimate, compare, units and arrange them in Julian style
- p. Estimate, compare, units and arrange them in Julian style
- q. Estimate, compare, units and arrange them in Julian style
- r. Estimate, compare, units and arrange them in Julian style
- s. Estimate, compare, units and arrange them in Julian style
- t. Estimate, compare, units and arrange them in Julian style
- u. Estimate, compare, units and arrange them in Julian style
- v. Estimate, compare, units and arrange them in Julian style
- w. Estimate, compare, units and arrange them in Julian style
- x. Estimate, compare, units and arrange them in Julian style
- y. Estimate, compare, units and arrange them in Julian style
- z. Estimate, compare, units and arrange them in Julian style

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number read from a display read out
- c. Recognize a reading from a gauge with color divisions
- d. Recognize positive (+) and negative (-) definite amount on a scale
- e. Select (hand) from a model to gauge
- f. Match a gauge reading to a specification using numerical or labeled intervals
- g. Interpret gauge readings from an uncalibrated/unmarked scale
- h. Interpret a gauge reading which is fluctuating or momentarily visible
- i. Match specifications of required measures by manipulation, alignment or interference

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware or components may be moved
- b. Manipulate objects to design, match, mate, make parallel, be perpendicular or at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures or photographs
- d. Create geometric symbols and graphic representations for actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number of measures (1, 2, 3, 4, or 5) or right angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical angles, corresponding angles, supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify attitudes and measures of triangles or the bisector of an angle
- e. Name an angle by one letter, a number or a single letter

NT

10. SOLIDS

- ✓ ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ✓ ☒ a Identify technical words associated with geometric figures
- ✓ ☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ✓ ☒ a Add or subtract whole numbers, without carrying or borrowing
- ✓ ☒ b Add or subtract whole numbers, carrying and borrowing
- ✓ ☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- ✓ ☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- ✓ ☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- ✓ ☒ f Add or subtract various instruments on gauges, dials, or any other measuring instrument
- ✓ ☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- ✓ ☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ✓ ☒ a Multiply and divide whole numbers
- ✓ ☒ b Multiply and divide mixed numbers (whole and decimals)
- ✓ ☒ c Divide a number with decimals in both divisor and dividend
- ✓ ☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- ✓ ☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ✓ ☒ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- ✓ ☒ b Reduce fractions to lowest terms
- ✓ ☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- ✓ ☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- ✓ ☒ e Add and subtract fractions, with same or different denominators
- ✓ ☒ f Multiply and divide fractions with and without whole numbers
- ✓ ☒ g Estimate a fraction sum, product or quotient

NT

15. GEOMETRY

- ✓ ☒ a Draw geometric figures, plane and solid
- ✓ ☒ b Match geometric figures with word names, equivalent measures
- ✓ ☒ c Label all parts of geometric figures using mathematical and characteristic designations
- ✓ ☒ d Use a protractor to measure angles, make geometrical constructions
- ✓ ☒ e Construct perpendicular on a line segment, bisect an angle
- ✓ ☒ f Compute the perimeter and area of any figure
- ✓ ☒ g Compute the circumference and area of a circle
- ✓ ☒ h Compute the area and volume of any solid figure
- ✓ ☒ i Use formulas in solving problems involving geometric figures
- ✓ ☒ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ✓ ☒ a Identify median and mode
- ✓ ☒ b Compute averages
- ✓ ☒ c Solve problems combining all processes using whole, mixed numbers and fractions
- ✓ ☒ d Solve problems, containing all processes involving units of measurement
- ✓ ☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- ✓ ☒ f Solve conversion problems of linear (metric and English) length, weight and temperature (F or C) measures
- ✓ ☒ g Solve problems involving ratio and proportion
- ✓ ☒ h Solve word problems where any mathematical process may be or

17. GRAPHING IN THE COORDINATE PLANE

- ✓ ☒ a Identify coordinates of a point in any grid system
- ✓ ☒ b Identify points on a line graph
- ✓ ☒ c Match a graph with its equation

18. ALGEBRA

- ✓ ☒ a Solve simple algebraic equations with one unknown
- ✓ ☒ b Recognize and derive equivalent algebraic expressions
- ✓ ☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ✓ ☒ a Use tables of trigonometric functions
- ✓ ☒ b Use tables of logarithms to solve problems
- ✓ ☒ c Solve geometric problems using trigonometric functions
- ✓ ☒ d Use trigonometric ratios to solve problems

CONTENT READER

NT

30. CONTENT READER

- Identify factual details in specific charts that are found within a document or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

31. VOCABULARY

- Recognize common words and their meanings.
- Recognize task-related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or subsystem heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim-reading, whether the information is relevant.
- Cross-reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Analyze information from tables and charts for locating malfunctions or for planning a course of action.

VISUAL AIDS

NT

29. FLOW CHARTS

- Identify details (labels, numbers, and points) from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly.
- Interpret a three-dimensional projection or a exploded view of object (s) for assembly, disassembly or position in system or sub-system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide, integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternative paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the notes taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Revise all recorded details to sentence form.
- Organize all sentences into paragraphs.

14 OUTLINING (topic or sentence)

- a ☒ Distinguish between major and subordinate topics
- b ☒ Generate titles for each major topic selected
- c ☒ Use phrases or sentences to provide subordinate details under each major topic
- d ☒ Alternate, indent numbers and letters to establish a hierarchy

15 REPORT WRITING

- a ☒ State the intent for other levels of the report
- b ☒ Describe the parameters of the event or situation
- c ☒ Distinguish between relevant and irrelevant details
- d ☒ Sequence events in the order they have occurred
- e ☒ State general impressions of events described
- f ☒ Select examples that will clarify major issues presented in the report
- g ☒ Examine opposing points of view in the report
- h ☒ Summarize the major points developed in the report
- i ☒ Justify an action taken and give reasons for rejecting alternatives

16 EDITING

- a ☒ Spell frequently used words correctly
- b ☒ Spell task related words correctly
- c ☒ Identify words that need to be capitalized
- d ☒ Correct all misspelled words with or without the use of a reference source
- e ☒ Apply all rules for end marks, commas and apostrophes
- f ☒ Apply common rules of grammar
- g ☒ Revise the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- h ☒ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a ☒ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b ☒ Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c ☒ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d ☒ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e ☒ Interview - a person communicating with another about his activities
- f ☒ Options of subject expertise for the purpose of using the information in a task
- g ☒ Briefing - communicating brief instructions to others or giving an account in authority
- h ☒ Consultation - communicating together to exchange ideas or opinions to be chosen, give or take advice or to develop an acceptance of a plan or action
- i ☒ Command - communicate to others in order of action to be taken where a person has a position of authority

4/23/82

38 CHARACTERISTICS

- a ☒ Enunciate clearly, using the proper rate of speech
- b ☒ Use technical vocabulary suitable to the task and level of the person
- c ☒ Determine the appropriate amount of information to communicate
- d ☒ Interpret figurative or idiomatic language by reference to its use in context
- e ☒ Follow highly detailed, step-by-step directions
- f ☒ Solicit feedback to confirm the accurate reception of the communication
- g ☒ Recognize when a low key, informal dialogue is suitable
- h ☒ Recognize when direct verbal commands are necessary
- i ☒ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j ☒ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a ☒ Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b ☒ Recognize personality factors and interpersonal relationships that may exist
- c ☒ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a ☒ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b ☒ Apply preventive measures prior to task performance to minimize any potential safety or security problems
- c ☒ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a ☒ Identify similarities and differences between and among objects
- b ☒ Use body language (motions, gestures, postures) to communicate or signal
- c ☒ Determine the presence of a defect or extent of damage
- d ☒ Match objects by size, shape, color and significant markings
- e ☒ Classify objects by size, shape, color and significant markings
- f ☒ Determine direction, duration, and intensity of sounds, sightings, and smells
- g ☒ Infer from sights, sounds, touch, smells or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Match numerals with word names and models. |
| <input checked="" type="checkbox"/> | b | Write numerals one through <u>N</u> in sequential order from any starting point. |
| <input checked="" type="checkbox"/> | c | State what numeral comes after, before, or between any two given numerals. |
| <input checked="" type="checkbox"/> | d | Select the numeral which is greater/less from a set of numerals. |
| <input checked="" type="checkbox"/> | e | Identify an object with a specified ordinal position. |
| <input checked="" type="checkbox"/> | f | Write or state the place value of a particular digit: whole or decimal number. |
| <input checked="" type="checkbox"/> | g | Round off a number to a specified place: whole or decimal. |
| <input checked="" type="checkbox"/> | h | Count by ones, tens, fives, tens, etc. backward or forward (skip counting). |
| <input checked="" type="checkbox"/> | i | Match numbers with points or intervals on a number line (positive (+) or negative (-) values). |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Name the markings on a linear scale. |
| <input checked="" type="checkbox"/> | b | Differentiate units of measure and equivalents in the English and metric system. |
| <input checked="" type="checkbox"/> | c | Use a ruler, yardstick, meter stick in scale to measure lengths of objects or distances. |
| <input checked="" type="checkbox"/> | d | Identify measures of ounce, pound, gram. |
| <input checked="" type="checkbox"/> | e | Identify measures of pints, quarts, gallons, liters. |
| <input checked="" type="checkbox"/> | f | Use a scale which is not numerically calibrated. |
| <input checked="" type="checkbox"/> | g | Estimate measures of varying lengths, dimensions or weights. |

3. DEGREE MEASURES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify degree or mill as a unit in determining direction, distance or temperature. |
| <input checked="" type="checkbox"/> | b | Estimate the measure of a given angle not greater than 180° . |
| <input checked="" type="checkbox"/> | c | Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils. |

4. TIME TELLING MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a 24-hour or digital clock to tell time. |
| <input checked="" type="checkbox"/> | b | Name intervals and tell time in hours, minutes, and seconds. |
| <input checked="" type="checkbox"/> | c | Estimate time in seconds, minutes, and parts of an hour. |
| <input checked="" type="checkbox"/> | d | Identify calendar units and arrange them in Julian style. |
| <input checked="" type="checkbox"/> | e | Convert time into hours and tens of hours. |
| <input checked="" type="checkbox"/> | f | Convert time using Greenwich Mean Time (GMT) as a basis for establishing time and distances. |

NT

b. GAUGE MEASURES

- | | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify the unit of measurement found on an instrument. |
| <input checked="" type="checkbox"/> | b | Interpret the number, word, symbol from a display read out. |
| <input checked="" type="checkbox"/> | c | Recognize a "reading" from a gauge with other divisions. |
| <input checked="" type="checkbox"/> | d | Recognize positive (+) and negative (-) indications on a scale. |
| <input checked="" type="checkbox"/> | e | Select band(s) from a multi scale gauge. |
| <input checked="" type="checkbox"/> | f | Match a gauge reading to a specification using numbered or labeled intervals. |
| <input checked="" type="checkbox"/> | g | Interpret gauge readings from an unnumbered/unmarked interval. |
| <input checked="" type="checkbox"/> | h | Interpret a gauge reading which is fluctuating or momentarily sustained. |
| <input checked="" type="checkbox"/> | i | Match specifications of required measures by manipulation, alignment or maintenance. |

VISUAL/SPATIAL RELATIONSHIPS

b. SPATIAL

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify directions that tools, hardware, or components may be moved. |
| <input checked="" type="checkbox"/> | b | Manipulate objects to align, match, mate, make parallel, be perpendicular to, be at an angle. |
| <input checked="" type="checkbox"/> | c | Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs. |
| <input checked="" type="checkbox"/> | d | Relate geometric symbols and graphic representations to actual systems, subsystems and components. |

GEOMETRY

7. LINES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name points, lines, rays, and segments. |
| <input checked="" type="checkbox"/> | b | Identify intersecting lines, parallel lines, and line segments. |
| <input checked="" type="checkbox"/> | c | Define and identify perpendicular lines. |
| <input checked="" type="checkbox"/> | d | Identify congruent segments. |

8. PLANES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name plane geometric figures. |
| <input checked="" type="checkbox"/> | b | List the characteristics of geometric figures. |
| <input checked="" type="checkbox"/> | c | Classify figures according to the number or measure of its sides or angles. |
| <input checked="" type="checkbox"/> | d | Identify figures which possess similarities. |
| <input checked="" type="checkbox"/> | e | Identify figures which may be parallel, perpendicular or congruent. |

9. ANGLES AND TRIANGLES

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify and name the different kinds of angles and triangles with their corresponding figures. |
| <input checked="" type="checkbox"/> | b | Identify vertical, adjacent, complementary, or supplementary angles. |
| <input checked="" type="checkbox"/> | c | Classify triangles according to their sides or angle size. |
| <input checked="" type="checkbox"/> | d | Identify altitudes and medians of triangles or the interior of an angle. |
| <input checked="" type="checkbox"/> | e | Name an angle by using letters, a point, or a single letter. |

NT

110. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures (requiring regrouping)
☒ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimal, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

MT

115. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figure symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems containing all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADINGS

NT

29. OTHER FUNCTIONAL FORMS

- Identify factual details or specific data that is found within a statement or written section.
- Select parts of text and visual materials to complete a task or study.
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret a written source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

30. VOCABULARY

- Recognize unknown words and their meanings.
- Recognize task related words with technical meaning.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim-reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Extract a fact or specification from a two column table or chart to find information.
- Extract a fact or specification from a multiple section of a row by column table or chart.
- Identify complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Access information from tables and charts for locating multiple items, or for organizing data into a table.

4/23/83

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, symbols, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of a subject for assembly/disassembly.
- Interpret a three dimensional perspective or exploded view of objects for assembly/disassembly or position in system or subsystem.
- Follow illustrations, or photographs, arranged in a sequential order as a guide to integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths to problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated unit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, designation of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compile information.

33. NOTE TAKING

- Distinguish between essential and non essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Present an recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34 OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate titles for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate, indent, number and letters to establish a hierarchy

35 REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- Spell frequently used words correctly
- Spell task related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- Briefing - communicating task instructions to others in giving an account in summary
- Grouped - coming or acting together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or direction
- Command - communicate to others an order of action to be taken where a person has a position of authority

4/23/82

MT

38 CHARACTERISTICS

- Enunciate clearly using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed step by step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problems
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smell, or taste to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through N in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit: whole or decimal number
- Round off a number to a specified place: whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, grain
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and differences

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a reading from a gauge with color divisions
- Recognize positive (+) and negative (-) denotation on a scale
- Select band(s) from a multi scale gage
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify direction, tools, hardware, or components may be moved
- Manipulate objects to align, match, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Heiste geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays and segments
- Identify intersecting lines, parallel lines and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides, angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designations
☒ d. Use a protractor to measure angles, make geometric constructions
☒ e. Construct perpendicular on a line segment, bisect an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) length, weight, and temperature (F or C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTINUED ADDING

21

20. PROBLEM SOLVING

- Identify the problem.
- Search for relevant and useful materials to provide a task history.
- Search for relevant and useful materials to provide a task history.
- Determine the expected outcome of a paragraph or sentence of written material.
- Interpret a writer's source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task-related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Determine the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source.

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or subsystem heading, appendix and glossary to locate information.
- Locate the page title, paragraph, figure or chart needed to answer a question or to solve a problem.
- Determine after scanning or skim-reading whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information.
- Obtain a fact or specification from an interactive table or chart to find information.
- Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart.
- Analyze information from tables and charts for locating major actions or for identifying cause and effect.

4/21/85

VISUAL AIDS

22

29. FLOW CHARTING

- Identify details, inputs, outputs, and part from a flow chart to determine a process.
- Identify process details from a flow chart to determine a process.
- Interpret a drawing which shows a process in a functional view of an assembly or assembly disassembly.
- Interpret a three dimensional perspective or isometric view of a component or assembly.
- Identify a flow chart's position to systems or subsystems.
- Follow flow charts, or pictographs, arranged in a sequential or hierarchical order.
- Integrate information from a flow chart to solve a problem or to complete a task.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to determine an organizational order.
- Use a linear path of a flow chart to provide actual and to show direction to a job effort to arrive at decision points, and to provide alternative paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in a schematic diagram from their origin to their point within or from one entity to another.
- Isolate a problem component in a schematic and trace its components, to find cause the problem.
- Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the blank on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

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|----|--|-------------------------------------|
| 33 | OUTLINING (topic or sentence) | |
| 1 | 1. Distinguish between major and subordinate topics | <input checked="" type="checkbox"/> |
| 2 | 2. Generate ideas for each major topic selected | <input checked="" type="checkbox"/> |
| 3 | 3. The plan, in so far as it tends to provide subordinate details under each major topic | <input checked="" type="checkbox"/> |
| 4 | 4. Alternate indent number bars and letters to establish a hierarchy | <input checked="" type="checkbox"/> |
| 35 | REPORT WRITING | |
| 1 | 1. State the intent or objective(s) of the report | <input checked="" type="checkbox"/> |
| 2 | 2. Describe the parameters of the report or situation | <input checked="" type="checkbox"/> |
| 3 | 3. Distinguish between relevant and irrelevant details | <input checked="" type="checkbox"/> |
| 4 | 4. Sequence events in the order they have occurred | <input checked="" type="checkbox"/> |
| 5 | 5. State general impressions of events described | <input checked="" type="checkbox"/> |
| 6 | 6. Select examples that will clarify major issues presented in the report | <input checked="" type="checkbox"/> |
| 7 | 7. Examine opposing points of view in the report | <input checked="" type="checkbox"/> |
| 8 | 8. Summarize the major points developed in the report | <input checked="" type="checkbox"/> |
| 9 | 9. Justify an action taken and give reasons for rejecting alternatives | <input checked="" type="checkbox"/> |

16 EDITING

| | | |
|---|---|-------------------------------------|
| 1 | 1. Spell frequently used words correctly | <input checked="" type="checkbox"/> |
| 2 | 2. Spell task related words correctly | <input checked="" type="checkbox"/> |
| 3 | 3. Identify words that need to be capitalized | <input checked="" type="checkbox"/> |
| 4 | 4. Correct all misspelled words with or without the use of a reference source | <input checked="" type="checkbox"/> |
| 5 | 5. Apply all rules for mid marks, commas, and apostrophes | <input checked="" type="checkbox"/> |
| 6 | 6. Apply common rules of grammar | <input checked="" type="checkbox"/> |
| 7 | 7. Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence | <input checked="" type="checkbox"/> |
| 8 | 8. Appraise an entire written communication and make adjustments to improve clarity | <input checked="" type="checkbox"/> |

VERBAL COMMUNICATION

| | | |
|----|---|-------------------------------------|
| 37 | TYPE | |
| 1 | 1. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed | <input checked="" type="checkbox"/> |
| 2 | 2. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide | <input checked="" type="checkbox"/> |
| 3 | 3. Turn - interaction takes place between two persons where one is instructing and the other is doing the task | <input checked="" type="checkbox"/> |
| 4 | 4. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done | <input checked="" type="checkbox"/> |
| 5 | 5. Interview - a person communicating with another about his activities upon which a subject expertise for the purpose of using the information for a task | <input checked="" type="checkbox"/> |
| 6 | 6. Briefing - communicating final instructions to others or giving an account in summary | <input checked="" type="checkbox"/> |
| 7 | 7. Consensus - communicating together to exchange ideas or opinions to reach a decision or to take action, or to arrive at an acceptance of a plan or the term | <input checked="" type="checkbox"/> |
| 8 | 8. Command - communicating to others an order or action to be taken where a person is in a position of authority | <input checked="" type="checkbox"/> |

4/23/82

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38 CHARACTERISTICS

| | | |
|----|---|-------------------------------------|
| 1 | 1. Emulate clarity using the proper rate of speech | <input checked="" type="checkbox"/> |
| 2 | 2. Use technical vocabulary suitable to the task and needs of the person | <input checked="" type="checkbox"/> |
| 3 | 3. Determine the appropriate amount of information to communicate | <input checked="" type="checkbox"/> |
| 4 | 4. Interpret figurative or idiosyncratic language by reference to its use in context | <input checked="" type="checkbox"/> |
| 5 | 5. Follow highly detailed step by step directions | <input checked="" type="checkbox"/> |
| 6 | 6. Select feedback to confirm the accurate reception of the communication | <input checked="" type="checkbox"/> |
| 7 | 7. Recognize when a low key, informal dialogue is suitable | <input checked="" type="checkbox"/> |
| 8 | 8. Recognize when direct two-way communication is necessary | <input checked="" type="checkbox"/> |
| 9 | 9. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort | <input checked="" type="checkbox"/> |
| 10 | 10. Recognize when the situation will require a structured, preplanned method of presentation | <input checked="" type="checkbox"/> |

39 BARRIERS

| | | |
|---|--|-------------------------------------|
| 1 | 1. Recognize the need for clear, concise directions in order to avoid language or word meaning differences | <input checked="" type="checkbox"/> |
| 2 | 2. Recognize personality factors and inter personal relationships that may exist | <input checked="" type="checkbox"/> |
| 3 | 3. Recognize feedback as a means of communicating more effectively and increasing task competence | <input checked="" type="checkbox"/> |

SAFETY/SECURITY

40 PRECAUTIONS

| | | |
|---|---|-------------------------------------|
| 1 | 1. Use common knowledge to avoid hazards in order to protect property and equipment | <input checked="" type="checkbox"/> |
| 2 | 2. Apply preventive measures prior to task performance to minimize any potential safety or security problem | <input checked="" type="checkbox"/> |
| 3 | 3. Select an appropriate course of action in the event of an emergency | <input checked="" type="checkbox"/> |

PERCEPTUAL

41 RECOGNITION

| | | |
|---|---|-------------------------------------|
| 1 | 1. Identify similarities and differences between and among objects | <input checked="" type="checkbox"/> |
| 2 | 2. Use body language (motions, gestures, postures) to communicate or signal | <input checked="" type="checkbox"/> |
| 3 | 3. Determine the presence of a defect or extent of damage | <input checked="" type="checkbox"/> |
| 4 | 4. Match objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| 5 | 5. Classify objects by size, shape, color and significant markings | <input checked="" type="checkbox"/> |
| 6 | 6. Determine direction, direction, and intensity of sounds, light, smell and smells | <input checked="" type="checkbox"/> |
| 7 | 7. Infer from signs, sounds, touch, smell, or taste to determine a course of action | <input checked="" type="checkbox"/> |

NUMERICAL MEASUREMENT

NT

1. NUMERICAL MEASUREMENT

- a. Match items in sets with same and make 10.
- b. Write numerals on the top of a paper strip and use a string to make a loop.
- c. Show what a number means by using a string to make a loop.
- d. Use a string to make a loop and use a string to make a loop.
- e. Identify an object with a specified number of items.
- f. Write or state the place value of a point on a digit wheel or the value of a number.
- g. Round off a number to a specified place, whole or decimal.
- h. Count by ones, tens, hundreds, thousands, or millions.
- i. Match numbers with points or intervals on a number line (positive or negative values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale.
- b. Differentiate units of measure and equivalents in the English and metric systems.
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects in distance.
- d. Identify measures of units: pound, gram.
- e. Identify measures of units: pints, quarts, gallons, liters.
- f. Use a scale which is not numerically calibrated.
- g. Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- a. Identify degree or half as a unit in determining direction, distance or position.
- b. Estimate the measure of a given angle not greater than 180°.
- c. Interpret bearings, clockwise and other contexts in which the measure of an angle may range from 0° to 360°.

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time.
- b. Name intervals and tell time in hours, minutes, and seconds.
- c. Estimate time in seconds, minutes, and parts of an hour.
- d. Identify calendar units and arrange them in Julian style.
- e. Convert time into hours and tenths of hours.
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing time and distances.

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5. GAUGE MEASURES

- a. Identify the part of a machine or tool used in an experiment.
- b. Interpret the number, word, symbol or figure on a display, read out, or gauge.
- c. Interpret a "reading" from a gauge with color, diagrams, or figures.
- d. Interpret positive (+) and negative (-) figures on a scale.
- e. Interpret a "reading" from a scale.
- f. Match a gauge reading to a specific value using number or label on a scale.
- g. Interpret gauge readings from an unmarked and unmarked interval.
- h. Interpret a gauge reading which is not being or maintained by a label.
- i. Match specific data of required measure by manipulation, alignment, or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that form, but have or components may be moved.
- b. Manipulate objects to align, match, make, make parallel, be perpendicular, be at an angle.
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs.
- d. Relate geometric symbols of geometric representations to a tool, systems, subsystems and components.

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments.
- b. Identify intersecting lines, parallel lines, and line segments.
- c. Define and identify perpendicular lines.
- d. Identify congruent segments.

8. PLANES

- a. Identify and name plane geometric figures.
- b. List the characteristics of geometric figures.
- c. Classify figures according to the number or measure of sides or angles.
- d. Identify figures which possess similarities.
- e. Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with the corresponding figures.
- b. Identify vertical, adjacent, complementary or supplementary angles.
- c. Classify triangles according to their sides or angle size.
- d. Identify altitudes and medians of triangles or the bisector of an angle.
- e. Name an angle by using letters, a number, or a single letter.

NT

10. TERMINOLOGY

- a. Draw angles and explain the names of angles with their corresponding figures.
- b. Explain the terms: vertices, rays, intersecting, parallel, perpendicular, complementary, supplementary, adjacent, and opposite angles.
- c. Explain the terms: line, line segment, ray, and point.
- d. Explain the terms: acute, obtuse, right, and straight angles.

COMPUTE OR PERFORM

11. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers without carrying or borrowing.
- b. Add or subtract whole numbers, carrying and borrowing.
- c. Add and subtract borrowing and carrying with mixed numbers (whole and decimals).
- d. Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution.
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes.
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument.
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping.
- h. Estimate a sum or difference.

12. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers.
- b. Multiply and divide mixed numbers (whole and decimals).
- c. Divide a number with decimals in both divisor and dividend.
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper signs to product or quotient.
- e. Estimate a product or quotient.

13. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8).
- b. Reduce fractions to lowest terms.
- c. Convert fractions (proper and improper) to decimal equivalents and vice versa, using a table, chart or gauge.
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms.
- e. Add and subtract fractions with same or different denominators.
- f. Multiply and divide fractions with and without whole numbers.
- g. Estimate a fraction, decimal, percent, or quotient.

NT

15. GEOMETRY

- a. Draw geometric figures: plane and solid.
- b. Match geometric figures with word names, equivalent measures.
- c. Label all parts of geometric figures using mathematical symbols and designations.
- d. Use a protractor to measure angles, make geometric constructions.
- e. Construct perpendicular on a line segment, bisector of an angle.
- f. Compute the perimeter and area of any figure.
- g. Compute the circumference and area of a circle.
- h. Compute the area and volume of any solid figure.
- i. Use formulas in solving problems involving geometric figures.
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays.

16. COMBINATION OF PROCESSES

- a. Identify median and mode.
- b. Compute averages.
- c. Solve problems combining all processes using whole, mixed numbers and fractions.
- d. Solve problems, combining all processes, in solving units of measurement.
- e. Interpret information from charts, number lines, tables, and graphs to solve arithmetic problems.
- f. Solve conversion problems of linear (meter and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$) measures.
- g. Solve problems involving ratio and proportion.
- h. Solve word problems where any mathematical process may occur.

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system.
- b. Identify points on a line graph.
- c. Match a graph with its equation.

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown.
- b. Recognize and derive equivalent algebraic expressions.
- c. Evaluate powers and estimate roots.

19. TRIGONOMETRY

- a. Use tables of trigonometric functions.
- b. Use tables of basic trigonometric functions to solve problems.
- c. Solve geometric problems using trigonometric functions.
- d. Use trigonometric ratios to solve problems.

VICINAL AMINES.

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[illegible]

1. (a) $\frac{1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{2}$ (d) $\frac{1}{2}$ (e) $\frac{1}{2}$ (f) $\frac{1}{2}$ (g) $\frac{1}{2}$ (h) $\frac{1}{2}$ (i) $\frac{1}{2}$ (j) $\frac{1}{2}$ (k) $\frac{1}{2}$ (l) $\frac{1}{2}$ (m) $\frac{1}{2}$ (n) $\frac{1}{2}$ (o) $\frac{1}{2}$ (p) $\frac{1}{2}$ (q) $\frac{1}{2}$ (r) $\frac{1}{2}$ (s) $\frac{1}{2}$ (t) $\frac{1}{2}$ (u) $\frac{1}{2}$ (v) $\frac{1}{2}$ (w) $\frac{1}{2}$ (x) $\frac{1}{2}$ (y) $\frac{1}{2}$ (z) $\frac{1}{2}$

to problems involving

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| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | if Identify a solid component in a bubble and if treat of the component is not of to cause the problem: |
| <input checked="" type="checkbox"/> | if Interpret symbols to indicate direction of flow, test points, connections and characteristic device points |

W. W. W.

| 13. NOTE TAKING | |
|-----------------|---|
| a | Distinguish between essential and non-essential details during the process |
| b | Record details without misinterpreting the intent of either words or an interview |
| c | Record all recorded details in your notes |
| d | Organize all services into paragraphs |

SCIENTIFIC ABSTRACTS IN

| | |
|-----|---|
| 4. | Understand clearly, using the proper sets of words. |
| 5. | Use formal vocabulary suitable to the task and level of the problem. |
| 6. | Obtain the appropriate amount of information for an accurate decision. |
| 7. | Interpret figurative or abstract language by reference to known facts and follow a clearly defined step-by-step function. |
| 8. | Sum it back to confirm the accuracy of the communication. |
| 9. | Recognize when a low key, informal dialogue is suitable. |
| 10. | Recognize when a direct verbal interchange is necessary. |
| 11. | Recognize when a prolonged series of verbal interchanges is required to coordinate a group effort. |
| 12. | Recognize when the situation will require a structured, preplanned method of presentation. |

5. BARRIERS

- a. How capture the need for close work direction, in order to avoid language of word meaning differences
- b. How capture personality factors and interpersonal differences that may exist
- c. How capture feedback as a means of confirming they more effectively had the training task competence

SAFETY/SECURITY

10 PRECAUTIONS

- a. Use common knowledge to develop methods and tools to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to prevent safety potential safety or security problem
- c. Select appropriate course of action in the event of an emergency

CULTURAL COMMUNICATION

1. 2. 3.

1. **Task** – something *to* do, a task and communicating with a **client** where *no* change is needed or where a **superior** decision is needed
2. **Information** – a task activity requiring communication between an **actor** and a **client** in a small group where the purpose is to give facts or rules to inform or **teach**
3. **Talk** – someone takes place between two persons where one is **controlling** and the other is **doing** the task
4. **Peer Group** – less than 101 all members engage in an activity where *one* person **directs** and **evaluates** time and communicates to others what is to be **done**
5. **Interact** – a person communicating with another **without** having an **activity** or **role** or **value** to **superior** but the purpose of using the information in a task
6. **Working** – a person having that action body to others or **spending** an **activity** in a group
7. **Cooperate** – someone is doing together to exchange ideas or **opportunities** to the **mutual** **benefit** of both where *no* exchange of a plan or the **exchange** **among** a **number** of others or **action** to be taken where a **person** has a **position** of **authority**

NUMERATION, PLACE VALUE

NT

1. NUMERATION AND COUNTING

- Match numerals with word names and models.
- Write numerals one through N in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater/less than a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit: whole or decimal number.
- Round off a number to a specified place: whole or decimal.
- Count by ones, tens, fives, tens etc. back ward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearing, azimuth, and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time in to hours and tenths of hours.
- Calculate time using Greenwich Mean Time (GMT) as a basis for establishing time and distances.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol, from a display read out.
- Make a "reading" from a gauge with color divisions.
- Recognize positive (+) and negative (-) documentation on a scale.
- Select barrel(s) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered or marked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustaining.
- Match specifications of required methods by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be placed.
- Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawing, pictures, or photographs.
- Relate geometric, symbol, and graphic representations to actual systems subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarity.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

10. SOLIDS

- ☒ a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a Identify technical words associated with geometric figures
☒ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a Add or subtract whole numbers, without carrying or borrowing
☒ b Add or subtract whole numbers, carrying and borrowing
☒ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a Multiply and divide whole numbers
☒ b Multiply and divide mixed numbers (whole and decimals)
☒ c Divide a number with decimals in both divisor and dividend
☒ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b Reduce fractions to lowest terms
☒ c Convert fractions (proper and improper) to decimal equivalents, and vice versa using a table, chart or gauge
☒ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e Add and subtract fractions, with same or different denominators
☒ f Multiply and divide fractions with and without whole numbers
☒ g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a Draw geometric figures, plane and solid
☒ b Match geometric figures with word names, equivalent measures
☒ c Label all parts of geometric figures using mathematical and characteristic designators
☒ d Use a protractor to measure angles, make geometrical constructions
☒ e Construct perpendicular on a line segment, bisector of an angle
☒ f Compute the perimeter and area of any figure
☒ g Compute the circumference and area of a circle
☒ h Compute the area and volume of any solid figure
☒ i Use formulas in solving problems involving geometric figures
☒ j Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a Identify median and mode
☒ b Compute averages
☒ c Solve problems combining all processes using whole, mixed numbers and fractions
☒ d Solve problems, combining all processes, involving units of measurement
☒ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f Solve conversion problems of linear (metric and English) length, weight, and temperature ($^{\circ}\text{F}$ or $^{\circ}\text{C}$) measures
☒ g Solve problems involving ratio and proportion
☒ h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a Identify coordinates of a point in any grid system
☒ b Identify points on a line graph
☒ c Match a graph with its equation

18. ALGEBRA

- ☒ a Solve simple algebraic equations with one unknown
☒ b Recognize and derive equivalent algebraic expressions
☒ c Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a Use tables of trigonometric functions
☒ b Use tables of logarithms to solve problems
☒ c Solve geometric problems using trigonometric functions
☒ d Use trigonometric ratios to solve problems

CONTENT READING

NT

29. PRESENT FORMAL DIFFICULTIES

- Identify factors in detail or in the abstract that we found within a system and in written sources.
- Select parts of text and visual materials to complete a task actively.
- Follow a highly detailed, step-by-step direction in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Interpret a written source which does not explicitly provide requested information in order to make a decision.
- Synthesize information from written sources which contrasts to the conclusion of a task activity.

30. VOCABULARY

- Recognize common words and their meanings.
- Recognize task-related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim-reading, whether the information is relevant.
- Cross-reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequential series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart.
- Apply information from tables and charts to creating functions or for selecting a course of action.

4/23/42

VISUAL AIDS

NT

29. TABLES/CHARTS

- Identify details taken from a chart or table and the relationship between them.
- Identify parts of data and relationships between them.
- Interpret a drawing which shows a cross section or view of an object for assembly disassembly.
- Interpret a three-dimensional perspective or expanded view of objects for assembly disassembly or replacement of system or subsystem.
- Follow illustrations in plotting applications arranged in a sequential order as a guide.
- Integrate information from various sources to complete a task or function.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to determine position in order.
- Use a complex path of a flow chart to determine logical and sequential order to a procedure to arrive at decision points and to perform an activity in predetermined order.
- Translate the significance of the flow chart into a verbal description.

31. SCHEMATICS

- Isolate and identify the functions and components of a system or device.
- Identify the components without identifying the functions.
- Trace the functions and components of a system or device without identifying the components.
- Isolate a problem component in a schematic and trace it to its specific function to solve the problem.
- Interpret symbols to indicate data flow in a flow chart or schematic diagrammatic decision point.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form.
- Write the name of the organization responsible person in appropriate section of equipment and non-equipment, in appropriate section of form for use.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate a sample information.

33. NOTE TAKING

- Distinguish between elements and relationships, details during the process.
- Record details without interrupting the content of either verbal or written interview.
- Reverberate all recorded details in writing the form.
- Organize all contents in into paragraphs.

NT

34. OUTLINING (topic or sentence)

- | | | |
|---|--|---|
| a | Distinguish between major and subordinate topics | ✓ |
| b | Generate titles for each major topic selected | ✓ |
| c | Use phrases or sentences to provide subordinate details under each major topic | ✓ |
| d | Alternate indent numbers and letters to establish a hierarchy | ✓ |

35. REPORT WRITING

- | | | |
|---|--|---|
| a | State the intent or objective(s) of the report | ✓ |
| b | Describe the parameters of the event or situation | ✓ |
| c | Distinguish between relevant and irrelevant details | ✓ |
| d | Sequence events in the order they have occurred | ✓ |
| e | State general impressions of events described | ✓ |
| f | Select examples that will clarify major issues presented in the report | ✓ |
| g | Examine opposing points of view in the report | ✓ |
| h | Summarize the major points developed in the report | ✓ |
| i | Justify an action taken and give reasons for rejecting alternatives | ✓ |

36. EDITING

- | | | |
|---|---|---|
| a | Spell frequently used words correctly | ✓ |
| b | Spell task related words correctly | ✓ |
| c | Identify words that need to be capitalized | ✓ |
| d | Correct all misspelled words with or without the use of a reference source | ✓ |
| e | Apply all rules for end marks, commas, and apostrophes | ✓ |
| f | Apply common rules of grammar | ✓ |
| g | Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence | ✓ |
| h | Appraise an entire written communication and make adjustments to improve clarity | ✓ |

VERBAL COMMUNICATION

37. TYPE

- | | | |
|---|---|---|
| a | Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed | ✓ |
| b | Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide | ✓ |
| c | Tutor - interaction takes place between two persons where one is instructing and the other is doing the task | ✓ |
| d | Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done | ✓ |
| e | Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task | ✓ |
| f | Briefing - communicating final instructions to others or giving an account in summary | ✓ |
| g | Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision | ✓ |
| h | Command - communicate to others an order or action to be taken where a person has a position of authority | ✓ |

4/23/82

NT

38. CHARACTERISTICS

- | | | |
|---|--|---|
| a | Enunciate clearly, using the proper rate of speech | ✓ |
| b | Use technical vocabulary suitable to the task and level of the person | ✓ |
| c | Determine the appropriate amount of information to communicate | ✓ |
| d | Interpret figurative or idiomatic language by reference to its use in context | ✓ |
| e | Follow highly detailed, step-by-step directions | ✓ |
| f | Solicit feedback to confirm the accurate reception of the communication | ✓ |
| g | Recognize when a low key, informal dialogue is suitable | ✓ |
| h | Recognize when direct verbal commands are necessary | ✓ |
| i | Recognize when a prescribed series of verbal interactions is required to coordinate a group effort | ✓ |
| j | Recognize when the situation will require a structured, preplanned method of presentation | ✓ |

39. BARRIERS

- | | | |
|---|---|---|
| a | Recognize the need for clear, concise directions in order to avoid language or word meaning differences | ✓ |
| b | Recognize personality factors and inter personal relationships that may exist | ✓ |
| c | Recognize feedback as a means of communicating more effectively and increasing task competence | ✓ |

SAFETY/SECURITY

40. PRECAUTIONS

- | | | |
|---|--|---|
| a | Use common knowledge to avoid hazards in order to prevent injury to self or equipment | ✓ |
| b | Apply preventive measures prior to task performance to minimize any potential safety or security problem | ✓ |
| c | Select an appropriate course of action in the event of an emergency | ✓ |

PERCEPTUAL

41. RECOGNITION

- | | | |
|---|---|---|
| a | Identify similarities and differences between and among objects | ✓ |
| b | Use body language (motions, gestures, postures) to communicate or signal | ✓ |
| c | Determine the presence of a defect or extent of damage | ✓ |
| d | Match objects by size, shape, color and significant markings | ✓ |
| e | Classify objects by size, shape, color and significant markings | ✓ |
| f | Determine direction, duration, and intensity of sounds, sightings and smells | ✓ |
| g | Infer from sights, sounds, touch, smells, or tastes to determine a course of action | ✓ |

h. Interpret Codes or Symbols

BSEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and needs
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit: whole or decimal number
- Round off a number to a specified place: whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric systems
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects in distances
- Identify measures of ounce, pound, gram
- Identify measures of pint, quart, gallon, liter
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hour, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Require a "reading" from a gauge with color divisions
- Require positive (+) and negative (-) designation on a scale
- Select bands from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unmarked adjourned interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Identify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a tab, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written section
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a Identify details labels numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33. NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Revise all recorded details in sentence form
- d Organize all sentences into paragraphs

34 OUTLINING (topic or subtopic)

- a. Distinguish between major and subordinate topics
- b. Generate ideas for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for and marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual: a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instructor: a task activity requiring communication between an instructor and individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor: interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10): all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview: a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing: communicating final instructions to others or giving an account in summary
- g. Counsel: communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command: communicate to others an order or action to be taken where a person has a position of authority

4/23/82

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a two-way, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate in signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes or symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models.
- Write numerals one through 10 in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater/less than a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit: whole or decimal number.
- Round off a number to a specified place: whole or decimal.
- Count by ones, tens, fives, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180°.
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hr. or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing local and distances.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number read, symbol found on a display read out.
- Recognize a reading from a gauge with minor divisions.
- Recognize positive (+) and negative (-) demarcation on a scale.
- Select hand(s) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or lettered intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of required measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that look, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictorial or photographs.
- Relate geometric symbols and graphic representations to actual systems, subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

10. SOLIDS

- ✓ ☐ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ✓ ☐ a. Identify technical words associated with geometric figures
- ✓ ☐ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ✓ ☐ a. Add or subtract whole numbers, without carrying or borrowing
- ✓ ☐ b. Add or subtract whole numbers, carrying and borrowing
- ✓ ☐ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- ✓ ☐ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- ✓ ☐ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- ✓ ☐ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- ✓ ☐ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- ✓ ☐ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ✓ ☐ a. Multiply and divide whole numbers
- ✓ ☐ b. Multiply and divide mixed numbers (whole and decimals)
- ✓ ☐ c. Divide a number with decimals in both divisor and dividend
- ✓ ☐ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- ✓ ☐ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ✓ ☐ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- ✓ ☐ b. Reduce fractions to lowest terms
- ✓ ☐ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- ✓ ☐ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- ✓ ☐ e. Add and subtract fractions, with same or different denominators
- ✓ ☐ f. Multiply and divide fractions with and without whole numbers
- ✓ ☐ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ✓ ☐ a. Draw geometric figures, plane and solid
- ✓ ☐ b. Match geometric figures with word names, equivalent measures
- ✓ ☐ c. Label all parts of geometric figures using mathematical and characteristic designators
- ✓ ☐ d. Use a protractor to measure angles, make geometrical constructions
- ✓ ☐ e. Construct perpendicular on a line segment, bisector of an angle
- ✓ ☐ f. Compute the perimeter and area of any figure
- ✓ ☐ g. Compute the circumference and area of a circle
- ✓ ☐ h. Compute the area and volume of any solid figure
- ✓ ☐ i. Use formulas in solving problems involving geometric figures
- ✓ ☐ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ✓ ☐ a. Identify median and mode
- ✓ ☐ b. Compute averages
- ✓ ☐ c. Solve problems combining all processes using whole, mixed numbers and fractions
- ✓ ☐ d. Solve problems, combining all processes, involving units of measurement
- ✓ ☐ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- ✓ ☐ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
- ✓ ☐ g. Solve problems involving ratio and proportion
- ✓ ☐ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ✓ ☐ a. Identify coordinates of a point in any grid system
- ✓ ☐ b. Identify points on a line graph
- ✓ ☐ c. Match a graph with its equation

18. ALGEBRA

- ✓ ☐ a. Solve simple algebraic equations with one unknown
- ✓ ☐ b. Recognize and derive equivalent algebraic expressions
- ✓ ☐ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ✓ ☐ a. Use tables of trigonometric functions
- ✓ ☐ b. Use tables of logarithms to solve problems
- ✓ ☐ c. Solve geometric problems using trigonometric functions
- ✓ ☐ d. Use trigonometric ratios to solve problems

39. REPORT WRITING

1. Paragraphs follow to inform and substantiate the topics.
2. Generate titles for each major topic presented.
3. Use phrases and sentences to provide subordinate details under each major topic.
4. Announce each number and letter to establish a hierarchy.

39. REPORT WRITING

1. State the intent or objective(s) of the report.
2. Describe the parameters of the event or situation.
3. Distinguish between relevant and irrelevant details.
4. Sequence events in the order they have occurred.
5. State general impressions of events described.
6. Select examples that will clarify major issues presented in the report.
7. Examine opposing points of view in the report.
8. Summarize the major points developed in the report.
9. Justify an action taken and give reasons for rejecting alternatives.

39. EDITING

1. Spell frequently used words correctly.
2. Spell task related words correctly.
3. Identify words that need to be capitalized.
4. Correct all misspelled words with or without the use of a reference source.
5. Apply all rules for end marks, commas, and apostrophes.
6. Apply common rules of grammar.
7. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence.
8. Alter an entire written communication and make adjustments to improve clarity.

VERBAL COMMUNICATION

1. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed.
2. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide.
3. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task.
4. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done.
5. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task.
6. Briefing - communicating final instructions to others or giving an account of a task.
7. Consensus - communicating together to exchange ideas or opinions to reach a decision, give advice, or to arrive at an acceptance of a plan or decision.
8. Persuasion - communicating to others an order or action to be taken where a decision is a condition of authority.

4/23/87

39. COMMUNICATIONS

1. Pronounce clearly, using the proper rate of speech.
2. Use technical vocabulary suitable to the task and level of the person.
3. Determine the appropriate amount of information to communicate.
4. Interpret figurative or idiomatic language by reference to its use in context.
5. Follow highly detailed, step by step directions.
6. Solicit feedback to confirm the accurate reception of the communication.
7. Recognize when a low key, informal dialogue is suitable.
8. Recognize when direct verbal comments are necessary.
9. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort.
10. Recognize when the situation will require a structured, preplanned method of presentation.

39. BARRIERS

1. Recognize the need for clear, concise directions in order to avoid language or word meaning differences.
2. Recognize personality factors and interpersonal relationships that may exist.
3. Recognize feedback as a means of communicating more effectively and increasing task competence.

SAFETY/SECURITY

40. PRECAUTIONS

1. Use common knowledge to avoid hazards in order to prevent injury to self or equipment.
2. Apply preventive measures prior to task performance to minimize any potential safety or security problem.
3. Select an appropriate course of action in the event of an emergency.

PERCEPTUAL

41. RECOGNITION

1. Identify similarities and differences between and among objects.
2. Use body language (motions, gestures, postures) to communicate a signal.
3. Determine the presence of a defect or extent of damage.
4. Match objects by size, shape, color and significant markings.
5. Classify objects by size, shape, color and significant markings.
6. Determine direction, duration, and intensity of sounds, sightings and smells.
7. Infer from sights, sounds, touch, smells, or tastes to determine a course of action.

h. Interpret codes & symbols

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written set of instructions.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task-related words with technical meanings.
- Identify the context meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source (document by code number and title).
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or across combination with text material outside the chart.
- Apply information from tables and charts for locating relationships or for selecting a course of action.

4/23/82

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nonwork status, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NUMERICAL PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after **before** or **between** any two given numerals
- Solve the numeral which is greater/less than a set of numerals
- Locate an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric systems
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and parts of hours
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing time zones
- Convert distance

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NT

5. GAUGE MEASURES

- Identify the unit of measurement of found on product charts
- Interpret the necessary word systems found on display read-out
- Recognize a reading from a gauge with a color display
- Recognize positive (+) and negative (-) tolerances on a work
- Select hard(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or lettered intervals
- Interpret gauge readings for internal tolerances or marked interval
- Interpret a gauge reading which is the leading or trailing zero significant
- Match size tolerances of any sized hardware for manufacturing alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify drawings that tools, hardware, or subassemblies may be viewed
- Manipulate objects to align, match, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and relate to 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to a tool system, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number of sides or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

16. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

17. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a tab, a chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

16. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

118. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, tables and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of trigonometric functions to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NE

25. PROOF READING DIRECTIONS

- Identify factual details to specify a task that are found within a statement or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly defined step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the tabs of contents, index, system or subsystem heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skimming, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Confirm a fact or specification from a two column table or chart to find information.
- Interpret a fact or specification from an intersection of a row by column table or chart.
- Interpret a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Access information from tables or charts for locating mathematics, or for making a sequence of action.

4.25.02

VISUAL AIDS

NE

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object like assembly, disassembly.
- Interpret a three dimensional picture from an exploded view of objects (S) for assembly, disassembly, or position to systems or subsystem.
- Follow illustrations, or photographs, arranged in a sequenced order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in a particular order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure to arrive at a decision point and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, data, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the recording process.
- Record data without misinterpreting the intent of author, written material, or an interview.
- Reverse all recorded details to sentence form.
- Organize all sentences into paragraphs.

NT

| | |
|----|---|
| 34 | OUTLINING (topic or sentence) |
| ✓ | a. Distinguish between major and subordinate topics |
| ✓ | b. Generate titles for each major topic selected |
| ✓ | c. Use phrases or sentences to provide subordinate details under each major topic |
| ✓ | d. Alternate, indent numbers and letters to establish a hierarchy |

| | |
|----|---|
| 35 | REPORT WRITING |
| ✓ | a. State the intent or objective(s) of the report |
| ✓ | b. Describe the parameters of the event or situation |
| ✓ | c. Distinguish between relevant and irrelevant details |
| ✓ | d. Sequence events in the order they have occurred |
| ✓ | e. State general impressions of events described |
| ✓ | f. Select examples that will clarify major issues presented in the report |
| ✓ | g. Examine opposing points of view in the report |
| ✓ | h. Summarize the major points developed in the report |
| ✓ | i. Justify an action taken and give reasons for rejecting alternatives |

| | |
|----|--|
| 36 | EDITING |
| ✓ | a. Spell frequently used words correctly |
| ✓ | b. Spell task related words correctly |
| ✓ | c. Identify words that need to be capitalized |
| ✓ | d. Correct all misspelled words with or without the use of a reference source |
| ✓ | e. Apply all rules for end marks, commas, and apostrophes |
| ✓ | f. Apply common rules of grammar |
| ✓ | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| ✓ | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

| | |
|----|--|
| 37 | TYPE |
| ✓ | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| ✓ | b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| ✓ | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| ✓ | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| ✓ | e. Interview - a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task |
| ✓ | f. Briefing - communicating final instructions to others or giving an account in summary |
| ✓ | g. Consult - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| ✓ | h. Command - communicate to others an order or action to be taken where a person has a position of authority |

NT

| | |
|----|---|
| 38 | CHARACTERISTICS |
| ✓ | a. Enunciate clearly, using the proper rate of speech |
| ✓ | b. Use technical vocabulary suitable to the task and level of the person |
| ✓ | c. Determine the appropriate amount of information to communicate |
| ✓ | d. Interpret figurative or idiomatic language by reference to its use in context |
| ✓ | e. Follow highly detailed, step-by-step directions |
| ✓ | f. Solicit feedback to confirm the accurate reception of the communication |
| ✓ | g. Recognize when a time-key, informal dialogue is suitable |
| ✓ | h. Recognize when direct verbal commands are necessary |
| ✓ | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| ✓ | j. Recognize when the situation will require a structured, preplanned method of presentation |

| | |
|----|--|
| 39 | BARRIERS |
| ✓ | a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| ✓ | b. Recognize personality factors and inter personal relationships that may exist |
| ✓ | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

| | |
|----|---|
| 40 | PRECAUTIONS |
| ✓ | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| ✓ | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| ✓ | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

| | |
|----|---|
| 41 | RECOGNITION |
| ✓ | a. Identify similarities and differences between and among objects |
| ✓ | b. Use body language (motions, gestures, postures) to communicate or signal |
| ✓ | c. Determine the presence of a defect or extent of damage |
| ✓ | d. Match objects by size, shape, color and significant markings |
| ✓ | e. Classify objects by size, shape, color and significant markings |
| ✓ | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| ✓ | g. Infer from sights, sounds, touch, smell, or tastes to determine a course of action |
| ✓ | h. Interpret codes and symbols |

4/23/82

BASE 1

NUMERATION PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models.
- Write numerals one through N in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater, lesser from a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit: whole or decimal number.
- Round off a number to a specified place: whole or decimal.
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure: lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Calculate time in seconds, minutes and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing time and distances.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display read out.
- Recognize "reading" from a gauge with color displays.
- Recognize positive (+) and negative (-) demonstration on a scale.
- Select bands from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered/unlabeled interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of required material by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs.
- Relate geometric symbols and graphic representations to actual systems subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-) and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents and mixed numbers to lowest terms
e. Add and subtract fractions with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) length, weight and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROCDURAL TABLES/FORMS

- Identify factual details or specifications that are bound within a statement or written section.
- Sort parts of text and visual materials to complete a task activity.
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Inter from a written source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by index number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skimming, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Determine a fact or specification from a two-column table or chart to find information.
- Recognize a fact or specification from an intersect of a row by column table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts to locating malfunctions, or for determining a sequence of action.

NT

29. ILLUSTRATION

- Identify details, labels, numbers, and put it from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system.
- Follow illustrations or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure to arrive at decision points and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another part within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate section of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the task, a process.
- Record details without misinterpreting the intent of either writer or speaker in an interview.
- Revise all recorded details in sentence form.
- Organize all sentence into paragraph.

NT

34 OUTLINING (topic or sentence)

- ✓ Distinguish between major and subordinate topics
- ✓ Generate titles for each major topic selected
- ✓ Use phrases or sentences to provide subordinate details under each major topic
- ✓ Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ✓ State the intent or object (verb) of the report
- ✓ Describe the parameters of the event or situation
- ✓ Distinguish between relevant and irrelevant details
- ✓ Sequence events in the order they have occurred
- ✓ State general impressions of events described
- ✓ Select examples that will clarify major issues presented in the report
- ✓ Examine opposing points of view in the report
- ✓ Summarize the major points developed in the report
- ✓ Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ✓ Spell frequently used words correctly
- ✓ Spell task related words correctly
- ✓ Identify words that need to be capitalized
- ✓ Correct all misspelled words with or without the use of a reference source
- ✓ Apply all rules for end marks, commas, and apostrophes
- ✓ Apply common rules of grammar
- ✓ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ✓ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- ✓ Individual -- a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ✓ Instructor -- a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ✓ Tutor -- interaction takes place between two persons where one is instructing and the other is doing the task
- ✓ Peer Group (less than 10) -- all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ✓ Interview -- a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ✓ Briefing -- communicating final instructions to others or giving an account in summary
- ✓ Consult -- communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ✓ Command -- communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ✓ Enunciate clearly, using the proper rate of speech
- ✓ Use technical vocabulary suitable to the task and level of the person
- ✓ Determine the appropriate amount of information to communicate
- ✓ Interpret figurative or idiomatic language by reference to its use in context
- ✓ Follow highly detailed, step-by-step directions
- ✓ Solicit feedback to confirm the accurate reception of the communication
- ✓ Recognize when a low-key, informal dialogue is suitable
- ✓ Recognize when direct verbal commands are necessary
- ✓ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ✓ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ✓ Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ✓ Recognize personality factors and interpersonal relationships that may exist
- ✓ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ✓ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ✓ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ✓ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ✓ Identify similarities and differences between and among objects
- ✓ Use body language (motions, gestures, postures) to communicate or signal
- ✓ Determine the presence of a defect or extent of damage
- ✓ Match objects by size, shape, color and significant markings
- ✓ Classify objects by size, shape, color and significant markings
- ✓ Determine direction, duration, and intensity of sounds, sights and smells
- ✓ Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, tens, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Calculate time using Greenwich Mean Time (GMT) as a basis for establishing local standard times |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a tab, a chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designations
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendiculars on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) length, weight, and temperature (F or C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADINGS

NT

25. PRINCIPAL DIRECTIONS

- Identify fact, details or specifications that are found within a statement or written action
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or subsystem heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine after scanning or skimming whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Locate a fact or specification from a two-column table or chart to find information
- Locate a fact or specification from a transaction of a row by column table
- Use a cross-index table or chart requiring cross referencing within or in combination with text material outside the chart
- Analyze information from tables and charts for locating malfunctions or for sequencing a course of action

4/2/89

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or subsystem
- Follow illustrations, or photographs, arranged in a sequential order as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual description to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Familiarize the significance of the symbols into physical activities

31. SCHEMATICS

- Locate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components located in cause the problem
- Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, discipline and the part or equipment, and nomenclature in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or organize information

33. NOTE-TAKING

- Distinguish between essential and non-essential details during the collection process
- Record details without misinterpreting the intent of either written or verbal interview
- Rewrite all recorded details in sentence form
- Organize sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instructor — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview — a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f. Briefing — communicating final instructions to others or giving an account in summary
- g. Council — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command — communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a. Enumerate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal comments are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and interpersonal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury, to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sights, up and down
- g. Infer from sights, sounds, touch, smells or tastes to determine a course of action

h. Interpret codes & symbols

4/23/82

BSEPI

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, tens etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR WEIGHT AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24-hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Calculate time left, hours and tenths of hours
- Calculate time using Greenwich Mean Time (GMT) as a basis for establishing zero as a reference

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NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number words yielded from a display read out
- Recognize a reading from a gauge with color markings
- Recognize positive (+) and negative (-) indications on a scale
- Select lands from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specification of required properties of manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that touch, intersect, or components may be derived
- Manipulate objects to align, match, make parallel, be perpendicular, be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angle
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the base of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisect an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) length, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

21

26. CONTENT READING

- Identify the main details or specific statements that are listed within a statement or written section.
- Select parts of text and visual materials to complete a task, activity, or process highly detailed step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Identify a writer's source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contribute to the completion of a task activity.

27. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

28. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Apply subtitle words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skimming, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

29. TABLES/CHARTS

- Compare a table for specifications from a two column table or chart to find information.
- Locate a fact or specification from a three column table or chart.
- Interpret a table or chart comparing facts or figures within or in combination with an additional or another chart.
- Identify and interpret data from tables and charts by locating markings, or for other information.

22

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection exploded view of objects (fit) for assembly, disassembly, or position in system or sub system.
- Follow illustrations or photography, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic, and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or record data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between material and non essential details during the analysis process.
- Record details without misinterpreting the intent of either the speaker or the interviewer.
- Reverse all recorded details in sentence form.
- Organize all sentences into paragraphs.

23

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34 OUTLINING (Topic - General)

- Establish a hierarchy of major and subordinate topics
- Generate points for each major topic selected
- Use the points to determine to provide subordinate details under each major topic
- Alternate index numbers and letters to establish a hierarchy

35 REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine supporting points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Revise the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use the technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step-by-step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- Identify similarities and differences between and among objects or signals
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sights and smells
- Infer from sight, sounds, touch, smells, or tastes to determine a course of action

BSIP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through N in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mill as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearing, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals of time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Calculate time intervals and tenths of hours |
| <input checked="" type="checkbox"/> | f. Use time-sensing (Greenwich Mean Time (GMT)) as a basis for establishing standard distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the numeral, word, symbol from a display read out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with a display division |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demonstration on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi-scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge reading from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is the testing or momentarily adjusted |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify directions that touch, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, make parallel, be perpendicular, or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawing, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angles |
| <input checked="" type="checkbox"/> | d. Identify attitudes and measures of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number or a single letter |

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures: plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designations
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulae in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid weight and temperature ($^{\circ}$ F or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

25. PROBLEM SOLVING

- Identify factual details or specific actions that are linked within a statement or written selection.
- Select parts of text and visual materials to complete a task activity.
- Follow highly defined step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributed to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Generate a fact or specification from a cross-column table or chart to find information.
- Generate a fact or specification from an intersection of a row by column table or chart.
- Use a frequency table or chart requiring cross referencing within or intersection with text material outside the chart.
- Apply information from tables and charts to locating malfunctions, or for determining a cause of action.

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly/disassembly.
- Interpret a three dimensional projection or exploded view of objects for assembly/disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Interrelate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origins to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form.
- Write the name of the organization responsible personnel, disposition of the part or equipment and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE TAKING

- Distinguish between essential and non-essential details during the problem solving process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in problem form.
- Organize all sentences into paragraphs.

NT

34 OUTLINING (topic or sentence)

- ✓ Distinguish between major and subordinate topics
- ✓ Generate titles for each major topic selected
- ✓ Use phrases or sentences to provide subordinate details under each major topic
- ✓ Alternate, indent sub-headers and letters to establish a hierarchy

35 REPORT WRITING

- ✓ State the intent or objective(s) of the report
- ✓ Describe the parameters of the event or situation
- ✓ Distinguish between relevant and irrelevant details
- ✓ Sequence events in the order they have occurred
- ✓ State general impressions of events described
- ✓ Select examples that will clarify major issues presented in the report
- ✓ Examine opposing points of view in the report
- ✓ Summarize the major points developed in the report
- ✓ Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ✓ Spell frequently used words correctly
- ✓ Spell task related words correctly
- ✓ Identify words that need to be capitalized
- ✓ Correct all misspelled words with or without the use of a reference source
- ✓ Apply all rules for end marks, commas, and apostrophes
- ✓ Apply common rules of grammar
- ✓ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ✓ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ✓ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ✓ Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ✓ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ✓ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ✓ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ✓ Briefing - communicating final instructions to others or giving an account in summary
- ✓ Consult - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ✓ Command - communicate to others an order of action to be taken where a person has a portion of authority

4/23/82

NT

38 CHARACTERISTICS

- ✓ Enunciate clearly, using the proper rate of speech
- ✓ Use technical vocabulary suitable to the task and level of the person
- ✓ Determine the appropriate amount of information to communicate
- ✓ Interpret figurative or idiomatic language by reference to its use in context
- ✓ Follow highly detailed, step by step directions
- ✓ Solicit feedback to confirm the accurate reception of the communication
- ✓ Recognize when a low-key, informal dialogue is suitable
- ✓ Recognize when direct verbal commands are necessary
- ✓ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ✓ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ✓ Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- ✓ Recognize personality factors and inter-personal relationships that may exist
- ✓ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ✓ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ✓ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ✓ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ✓ Identify similarities and differences between and among objects
- ✓ Use body language (motions, gestures, postures) to communicate or signal
- ✓ Determine the presence of a defect or extent of damage
- ✓ Match objects by size, shape, color and significant markings
- ✓ Classify objects by size, shape, color and significant markings
- ✓ Determine direction, duration, and intensity of sounds, sightings and smells
- ✓ Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models.
- Write numerals one through 9 in sequential order from any starting point.
- Write what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater, lesser from a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit, whole or decimal number.
- Round off a number to a specified place, whole or decimal.
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distance.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify calendar units and arrange them in Julian style.
- Convert time into hours and tenths of hours.
- Calculate time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances.

A-2752

NT

b. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display read out.
- Recognize a reading from a gauge with outer divisions.
- Recognize positive (+) and negative (-) indication on a scale.
- Select (handle) from a multi scale gauge.
- Match a gauge reading to a specification using rounded or labeled intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is fluctuating in moment only sustained.
- Match specifications of required measures by manipulation of element or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- Identify directions that tools, hardware, or components may be moved.
- Manipulate object to align, match, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures or photographs.
- Relate geometric symbols and graphic representations to actual systems subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with the corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify attitudes and methods of triangles of the bisector of an angle.
- Name an angle by using letters, a number or a single letter.

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION *In hexadecimal only

- ☒ a. Add or subtract whole numbers, without carrying or borrowing *
☒ b. Add or subtract whole numbers, carrying and borrowing *
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designations
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) length, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADING

VISUAL AIDS

NT

25. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written information.
- Select parts of text and visual materials to complete a task actively.
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

26. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system, heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine, after scanning or skim-reading, whether the information is relevant to perform a routine.
- Cross-reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information.
- Obtain a fact or specification from an intersection of a row by column, table or chart.
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart.
- Apply information from tables and charts for locating malfunctions, or for developing a course of action.

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order as a guide.
- Integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, consequences and diagrammatic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, data, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

33. NOTE-TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34 OUTLINING (topic or sentence)

- ☒ a Distinguish between major and subordinate topics
- ☒ b Generate titles for each major topic selected
- ☒ c Use phrases or sentences to provide subordinate details under each major topic
- ☒ d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ☒ a State the intent or objective(s) of the report
- ☒ b Describe the parameters of the event or situation
- ☒ c Distinguish between relevant and irrelevant details
- ☒ d Sequence events in the order they have occurred
- ☒ e State general impressions of events described
- ☒ f Select examples that will clarify major issues presented in the report
- ☒ g Examine opposing points of view in the report
- ☒ h Summarize the major points developed in the report
- ☒ i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ☒ a Spell frequently used words correctly
- ☒ b Spell task-related words correctly
- ☒ c Identify words that need to be capitalized
- ☒ d Correct all misspelled words with or without the use of a reference source
- ☒ e Apply all rules for end marks, commas, and apostrophes
- ☒ f Apply common rules of grammar
- ☒ g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ☒ a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b Instructor - a task activity requiring communication between an instructor and an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f Briefing - communicating final instructions to others or giving an account in summary
- ☒ g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h Command - communicate to others an order or action to be taken while a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ☒ a Enumerate clearly, using the proper rate of speech
- ☒ b Use technical vocabulary suitable to the task and level of the person
- ☒ c Determine the appropriate amount of information to communicate
- ☒ d Interpret figurative or idiomatic language by reference to its use in context
- ☒ e Follow highly detailed, step by step directions
- ☒ f Solicit feedback to confirm the accurate reception of the communication
- ☒ g Recognize when a low-key, informal dialogue is suitable
- ☒ h Recognize when direct verbal commands are necessary
- ☒ i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j Recognize when the situation will require a structured, predefined method of presentation

39 BARRIERS

- ☒ a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- ☒ b Recognize personality factors and interpersonal relationships that may exist
- ☒ c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ☒ a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ☒ a Identify similarities and differences between and among objects
- ☒ b Use body language (movements, gestures, postures) to communicate or signal
- ☒ c Determine the presence of a defect or extent of damage
- ☒ d Match objects by size, shape, color and significant markings
- ☒ e Classify objects by size, shape, color and significant markings
- ☒ f Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24-hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Use past time into hours and tens of hours
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

C-273

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with coin divisions
- Recognize positive (+) and negative (-) dimensionation on a scale
- Select bands from a multi scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, adjustment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify drawings that tools, hardware, or components may be moved
- Manipulate objects to align, match, make, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or a given
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fraction, sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems containing all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ F or $^{\circ}$ C) measure
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADINGS

NT

25. PROCEURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page title, paragraph figure, or chart needed to answer a question or to solve a problem
- Determine after scanning or skimming whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Organize a text or specification from a two column table or chart to find information
- Organize a text or specification from an introduction of a row by column table or chart
- Use a table or table or chart requiring cross referencing within or in combination with text material on side the chart
- Analyze information from tables and charts for locating mathematical or for solving a series of a task

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts for an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organization chart to list events in sequence in order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of other written material of an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34 OUTLINING (Topic or sentence)

- ✓ Distinguish between major and subordinate topics
- ✓ Generate titles for each major topic selected
- ✓ Use phrases or sentences to provide subordinate details under each major topic
- ✓ Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- ✓ State the intent or objective(s) of the report
- ✓ Describe the parameters of the event or situation
- ✓ Distinguish between relevant and irrelevant details
- ✓ Sequence events in the order they have occurred
- ✓ State general impressions of events described
- ✓ Select examples that will clarify major issues presented in the report
- ✓ Examine opposing points of view in the report
- ✓ Summarize the major points developed in the report
- ✓ Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- ✓ Spell frequently used words correctly
- ✓ Spell task-related words correctly
- ✓ Identify words that need to be capitalized
- ✓ Correct all misspelled words with or without the use of a reference source
- ✓ Apply all rules for end marks, commas, and apostrophes
- ✓ Apply common rules of grammar
- ✓ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ✓ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- ✓ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ✓ Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ✓ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ✓ Peer Group (less than 10) - all members engage in an activity where one person often acts as a leadership role and communicates to others what is to be done
- ✓ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ✓ Briefing - communicating final instructions to others or giving an account in summary
- ✓ Consult - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ✓ Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- ✓ Enumerate clearly, using the proper rate of speech
- ✓ Use technical vocabulary suitable to the task and level of the person
- ✓ Determine the appropriate amount of information to communicate
- ✓ Interpret figurative or idiomatic language by reference to its use in context
- ✓ Follow highly detailed, step-by-step directions
- ✓ Solicit feedback to confirm the accurate reception of the communication
- ✓ Recognize when a low key, informal dialogue is suitable
- ✓ Recognize when direct verbal commands are necessary
- ✓ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ✓ Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- ✓ Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- ✓ Recognize personality factors and inter-personal relationships that may exist
- ✓ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- ✓ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ✓ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ✓ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ✓ Identify similarities and differences between and among objects
- ✓ Use body language (motions, gestures, postures) to communicate or signal
- ✓ Determine the presence of a defect or extent of damage
- ✓ Match objects by size, shape, color and significant markings
- ✓ Classify objects by size, shape, color and significant markings
- ✓ Determine direction, duration, and intensity of sounds, sightings and smells
- ✓ Infer from sights, sounds, touch, smells, or tastes to determine a course of action

O-276

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of volume: pound, gram
- Identify measures of weight: quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify, degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings: azimuth and other contexts in which the measure of an angle is given from 0° to 360° to 6400 mils

4. TIME-TELLING MEASURES

- Use a 24-hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify a.m. and p.m. and arrange them in Julian style
- Convert time in hours and tenths of hours
- Convert time using Greenwich Mean Time (GMT) as a basis for establishing time zones

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with the corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides, angles, or size
- Identify altitudes and medians of triangles and the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

116. GEOMETRY

- Draw geometric figures, plane and solid
- Match geometric figures with word names, equivalent measures
- Label all parts of geometric figures using mathematical and characteristic designators
- Use a protractor to measure angles, make geometric constructions
- Construct perpendicular on a line segment, bisector of an angle
- Compute the perimeter and area of any figure
- Compute the circumference and area of a circle
- Compute the area and volume of any solid figure
- Use formulas in solving problems involving geometric figures
- Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

118. COMBINATION OF PROCESSES

- Identify median and mode
- Compute averages
- Solve problems combining all processes using whole, mixed numbers and fractions
- Solve problems, combining all processes, involving units of measurement
- Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- Solve conversion problems of linear (metric and English) length, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
- Solve problems involving ratio and proportion
- Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- Identify coordinates of a point in any grid system
- Identify points on a line graph
- Match a graph with its equation

118. ALGEBRA

- Solve simple algebraic equations with one unknown
- Recognize and derive equivalent algebraic expressions
- Evaluate powers and estimate roots

119. TRIGONOMETRY

- Use tables of trigonometric functions
- Use tables of logarithms to solve problems
- Solve geometric problems using trigonometric functions
- Use trigonometric ratios to solve problems

Identify and match the names of solids with their corresponding figures

117. TERMINOLOGY

- Identify the logical words associated with geometric figures
- Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- Add or subtract whole numbers, without carrying or borrowing
- Add or subtract whole numbers, carrying and borrowing
- Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- Add or subtract to find correct time (24 hr clock) using hours or minutes
- Add or subtract various increments on gauges, dials, or any other measuring instrument
- Add or subtract units: linear, dry, liquid or degree measures requiring regrouping
- Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- Multiply and divide whole numbers
- Multiply and divide mixed numbers (whole and decimals)
- Divide a number with decimals in both divisor and dividend
- Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- Estimate a product or quotient

114. FRACTIONS/DECIMALS

- Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
- Reduce fractions to lowest terms
- Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- Add and subtract fractions, with same or different denominators
- Multiply and divide fractions with and without whole numbers
- Estimate a fractional sum, product or quotient

CONTENT READING

NT

25. WHOLE-ORAL DIFFERENTIAL

- Identify the details or specific details that are found within a statement or written selection
- Select parts of text and visual materials to complete a task actively
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task-related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Locate the page, after scanning or skim-reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Organize data for specification from a table, column table or chart to find information
- Organize data for specification from an information system of flow by column table or chart
- Use a column table or chart requiring cross-referencing within or in combination with a column table or chart
- Use a column table or chart for locating information, or for

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross-sectional view of an object or assembly, disassembly
- Interpret a three-dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub-system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternative paths in problem-solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, text events, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, data, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the task or process
- Record details without misinterpreting the intent of either written material or an interview
- Review all recorded details in sentence form
- Organize all sentences into paragraphs

34. OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate ideas for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- State the subject or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- Spell frequently used words correctly
- Spell task related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Council - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

138. CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by inference to its use in context
- Follow highly detailed, step-by-step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

139. BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

140. PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

141. RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

9 SEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models.
- Write numerals one through 10^6 in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater/less than a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit, whole or decimal number.
- Round off a number to a specified place, whole or decimal.
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting).
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in the English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, grain.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify clock face units and arrange them in Julian style.
- Convert from 24 hour and tenths of hours.
- Convert from Julian to Greenwich Mean Time (GMT) as a basis for establishing zones of time.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display read out.
- Recognize a "loading" from a gauge with color divisions.
- Recognize positive (+) and negative (-) deflection on a scale.
- Select band(s) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is fluctuating or momentarily sustained.
- Match specifications of required measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that roads, hardware, or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs.
- Relate geometric symbols and graphic representations to actual systems, subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angles.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

NT

110. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find current time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and character designations
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English), and, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

29. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or action sentence.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

30. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

31. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Determine after scanning or skimming whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a task.
- Organize information from multiple sources into a sequenced series of events.

32. TABLES/CHARTS

- Obtain a list or specification from a two column table or chart to find information.
- Obtain a list or specification from an alphabetical or a row by column table or chart.
- Use a two column table or chart requiring cross referencing within or in combination with information outside the chart.
- Apply information from tables and charts to locating rail functions or for other tasks.

VISUAL AIDS

NT

33. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts of details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects (b) for assembly, disassembly or position in system or subsystem.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide.
- Integrate information from various sources to select a course of action.

34. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a problem, to arrive at decision points, and to provide alternative paths in problem solving.
- Translate the significance of the symbols into physical activities.

35. SCHEMATICS

- Isolate each device section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points.

WRITTEN COMMUNICATION

36. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from description or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, dispatcher of the part or equipment, and nonverbal, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compare information.

37. NOTE-TAKING

- Distinguish between essential and non essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34. OUTLINING (topic or sentence)

- ☒ a. Distinguish between major and subordinate topics
- ☒ b. Generate ideas for each major topic selected
- ☒ c. Use phrases or sentences to provide subordinate details under each major topic
- ☒ d. Alternate relevant numbers and letters to establish a hierarchy

35. REPORT WRITING

- ☒ a. State the intent or objective(s) of the report
- ☒ b. Describe the parameters of the event or situation
- ☒ c. Distinguish between relevant and irrelevant details
- ☒ d. Sequence events in the order they have occurred
- ☒ e. State general impressions of events described
- ☒ f. Select examples that will clarify major issues presented in the report
- ☒ g. Examine opposing points of view in the report
- ☒ h. Summarize the major points developed in the report
- ☒ i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- ☒ a. Spell frequently used words correctly
- ☒ b. Spell task-related words correctly
- ☒ c. Identify words that need to be capitalized
- ☒ d. Correct all misspelled words with or without the use of a reference source
- ☒ e. Apply all rules for end marks, commas, and apostrophes
- ☒ f. Apply common rules of grammar
- ☒ g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- ☒ a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ f. Briefing - communicating final instructions to others or giving an account in summary
- ☒ g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ h. Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- ☒ a. Enunciate clearly, using the proper rate of speech
- ☒ b. Use technical vocabulary suitable to the task and level of the person
- ☒ c. Determine the appropriate amount of information to communicate
- ☒ d. Interpret figurative or idiomatic language by reference to its use in context
- ☒ e. Follow highly detailed, step by step directions
- ☒ f. Solicit feedback to confirm the accurate reception of the communication
- ☒ g. Recognize when a low-key, informal dialogue is suitable
- ☒ h. Recognize when direct verbal commands are necessary
- ☒ i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- ☒ a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- ☒ b. Recognize personality factors and inter-personal relationships that may exist
- ☒ c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- ☒ a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- ☒ a. Identify similarities and differences between and among objects
- ☒ b. Use body language (motions, gestures, postures) to communicate or signal
- ☒ c. Determine the presence of a defect or extent of damage
- ☒ d. Match objects by size, shape, color and significant markings
- ☒ e. Classify objects by size, shape, color and significant markings
- ☒ f. Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 25 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric systems
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, grain
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth, and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify various units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Complete given using Greenwich Mean Time (GMT) as a basis for establishing time and phenomena

NT

6. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display readout
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) denotation on a scale
- Select bands from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds: angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

113 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

114 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

115 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116 COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) length, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

117 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

118 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

119 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

26. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written action.
- Select parts of text and visual materials to complete a task activity.
- Follow highly-sketched step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source, which does not explicitly provide required information, in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

27. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

28. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Re-read, after scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a routine.
- Organize information from multiple sources into a sequenced series of events.

29. TABLES/CHARTS

- Obtain a specific specification from a two column table or chart to find information.
- Obtain a specific information from an intersection of a row by column table or chart.
- Obtain a specific table or chart requiring cross referencing within or in combination with a table or chart outside the chart.
- Apply a table or chart to a task and check the results using multiple functions, or for comparison with other data.

VISUAL AIDS

NT

30. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture.
- Identify parts or details according to a key or legend.
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly.
- Interpret a three dimensional projection or exploded view of objects (s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action.

31. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual directions to a procedure to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

32. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points.

WRITTEN COMMUNICATION

33. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or convey information.

34. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

NT

34. OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate titles for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - instruction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Control - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step-by-step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low key, informal dialogue is suitable
- Recognize when direct verbal comments are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- Recognize personality factors and inter personal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models.
- Write numerals one through 9 in sequential order from any starting point.
- State what numeral comes after, before, or between any two given numerals.
- Select the numeral which is greater/less than a set of numerals.
- Identify an object with a specified ordinal position.
- Write or state the place value of a particular digit: whole or decimal.
- Round off a number to a specified place: whole or decimal.
- Count by ones, tens, etc. backward or forward (skip counting).
- Match numerals with points or intervals on a number line (positive (+) or negative (-) values).

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale.
- Differentiate units of measure and equivalents in U.S. English and metric system.
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances.
- Identify measures of ounce, pound, gram.
- Identify measures of pints, quarts, gallons, liters.
- Use a scale which is not numerically calibrated.
- Estimate measures of varying lengths, dimensions or weights.

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature.
- Estimate the measure of a given angle not greater than 180° .
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils.

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time.
- Name intervals and tell time in hours, minutes, and seconds.
- Estimate time in seconds, minutes, and parts of an hour.
- Identify months, weeks and arrange them in Dutch style.
- Convert time into hours and tenths of hour.
- Calculate time using Greenwich Mean Time (GMT) as a basis for establishing zones and differences.

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument.
- Interpret the number, word, symbol from a display read out.
- Recognize a "reading" from a gauge with color divisions.
- Recognize positive (+) and negative (-) denotation on a scale.
- Select bend(s) from a multi scale gauge.
- Match a gauge reading to a specification using numbered or labeled intervals.
- Interpret gauge readings from an unnumbered/unmarked interval.
- Interpret a gauge reading which is flexing or momentarily sustained.
- Match specifications of required measures by manipulation, alignment or maintenance.

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware or components may be moved.
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle.
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs.
- Relate geometric symbols and graphic representations to actual systems, subsystems and components.

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments.
- Identify intersecting lines, parallel lines, and line segments.
- Define and identify perpendicular lines.
- Identify congruent segments.

8. PLANES

- Identify and name plane geometric figures.
- List the characteristics of geometric figures.
- Classify figures according to the number or measure of its sides or angles.
- Identify figures which possess similarities.
- Identify figures which may be parallel, perpendicular or congruent.

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures.
- Identify vertical, adjacent, complementary or supplementary angles.
- Classify triangles according to their sides or angle size.
- Identify altitudes and medians of triangles or the bisector of an angle.
- Name an angle by using letters, a number, or a single letter.

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures.

11 TERMINOLOGY

- a. Identify the kind of words associated with geometric figures.
b. Interpret the meaning of terms derived from spatial orientation.

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing.
b. Add or subtract whole numbers, carrying and borrowing.
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals).
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution.
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes.
f. Add or subtract various increments on gauges, dials, or any other measuring instrument.
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping.
h. Estimate a sum or difference.

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers.
b. Multiply and divide mixed numbers (whole and decimals).
c. Divide a number with decimals in both divisor and dividend.
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient.
e. Estimate a product or quotient.

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$).
b. Reduce fractions to lowest terms.
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge.
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms.
e. Add and subtract fractions, with same or different denominators.
f. Multiply and divide fractions with and without whole numbers.
g. Estimate a fractional sum, product, or quotient.

15 GEOMETRY

- a. Draw geometric figures, plane and solid.
b. Match geometric figures with word names, equivalent measures.
c. Label all parts of geometric figures using mathematical and characteristic designations.
d. Use a protractor to measure angles, make geometrical constructions.
e. Construct perpendicular on a line segment, bisector of an angle.
f. Compute the perimeter and area of any figure.
g. Compute the circumference and area of a circle.
h. Compute the area and volume of any solid figure.
i. Use formulas in solving problems involving geometric figures.
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays.

16 COMBINATION OF PROCESSES

- a. Identify median and mode.
b. Compute averages.
c. Solve problems combining all processes using whole, mixed numbers and fractions.
d. Solve problems combining all processes, involving units of measurement.
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems.
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures.
g. Solve problems involving ratio and proportion.
h. Solve word problems where any mathematical process may occur.

17 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system.
b. Identify points on a line graph.
c. Match a graph with its equation.

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown.
b. Recognize and derive equivalent algebraic expressions.
c. Evaluate powers and estimate roots.

19 TRIGONOMETRY

- a. Use tables of trigonometric functions.
b. Use tables of logarithms to solve problems.
c. Solve geometric problems using trigonometric functions.
d. Use trigonometric ratios to solve problems.

CONTENT READING

NT

29. PROCEEDURE DIRECTIONS

- Identify the task details or specifications that are found within a statement or written direction.
- Select parts of text and visual materials to complete a task activity.
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities.
- Determine the essential message of a paragraph or section of written material.
- Infer from a written source which does not explicitly provide required information in order to make a decision.
- Synthesize information from written sources which contributes to the completion of a task activity.

30. VOCABULARY

- Recognize common words and their meanings.
- Recognize task related words with technical meanings.
- Identify the correct meaning of a word from the context of a sentence.
- Recognize the meaning of common contractions, abbreviations and acronyms.
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s).

INFORMATION ACCESS

31. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any relate source document by code number and title.
- Alphabetize words or topics to locate information.
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information.
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem.
- Combine a line scanning or skim reading, whether the information is relevant.
- Cross reference within and across source documents to select information needed to perform a task.
- Organize information from multiple sources into a sequenced series of events.

32. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information.
- Obtain a fact or specification from an information of a row by column table or chart.
- Recognize a table or chart requiring cross referencing within or in combination with text or a word outside the table or chart.
- Apply a table or chart to a task by using a table or chart to locate information.

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from illustrations. (picture)
- Identify parts in details according to a key or legend.
- Interpret a drawing which shows a cross section view of an object for assembly, disassembly.
- Interpret a three dimensional projection or expanded view of object(s) for assembly, disassembly, or position in system or sub system.
- Follow illustrations, or photographs, arranged in a sequential order, as a guide to integrate information from various sources to select a course of action.

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order.
- Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem solving.
- Translate the significance of the symbols into physical activities.

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram.
- Identify the components within each entity.
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another.
- Isolate a problem component in a schematic and trace it to components believed to cause the problem.
- Interpret symbols to indicate direction of flow, test points, components and schematic decision points.

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information.
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form.
- Write the name of the organization, responsible personnel, date and time of report or equipment, and nomenclature, in appropriate sections of the form.
- Write a descriptive account of an activity or transaction performed.
- Use a completed form to locate or compile information.

33. NOTE TAKING

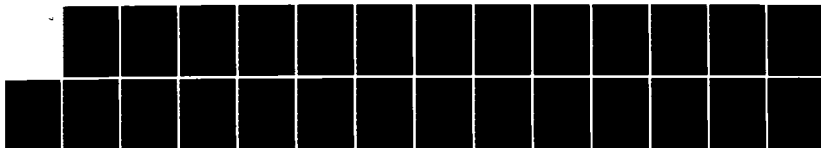
- Distinguish between essential and non-essential details during the note taking process.
- Record details without misinterpreting the intent of either written material or an interview.
- Rewrite all recorded details in sentence form.
- Organize all sentences into paragraphs.

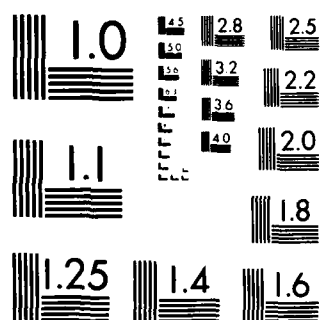
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FOR A BASIC SKILLS E. (U) RCA SERVICE CO CHERRY HILL NJ
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MICROCOPY RESOLUTION TEST CHART
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NT

34. OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate ideas for each major topic selected
- Use phrases or sentences to provide subordinate details under each major topic
- Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
- Select examples that will clarify major issues presented in the report
- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to officers or giving an account in summary
- Council - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
- Use technical vocabulary suitable to the task and level of the person
- Determine the appropriate amount of information to communicate
- Interpret figurative or idiomatic language by reference to its use in context
- Follow highly detailed, step by-step directions
- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low-key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

8 SEP 1

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, tens, fives, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pint, quart, gallon, liter |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° /N to 6400 mils |

4. TIME TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24 hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

6. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read-out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) demarcation on a scale |
| <input checked="" type="checkbox"/> | e. Select bands from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle-size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}\text{F}$ or $^{\circ}\text{C}$) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

VISUAL AIDS

12

67. ILLUSTRATIONS:

- | | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f | Integrate information from various sources to select a course of action |

SECRET

- c. Translate the significance of the symbols into physical activities to a procedure, to arrive at decision points, and to provide alternative paths in problem solving.

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— d. 1351

- to cause the problem
- a. Interpret symbols to indicate direction of flow, test points, components and diametric decision points

✓

- | | | |
|-------------------------------------|----|---|
| <input checked="" type="checkbox"/> | a. | Use a completed form to locate or compare information |
|-------------------------------------|----|---|
- ### 33. NOTE TAKING
- | | | |
|-------------------------------------|----|--|
| <input checked="" type="checkbox"/> | a. | Distinguish between essential and non-essential details during the note-taking process |
| <input checked="" type="checkbox"/> | b. | Record details without misinterpreting the intent of either written material or an interview |
| <input checked="" type="checkbox"/> | c. | Rewrite all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d. | Organize all sentences into paragraphs |

NT

34. OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37. TYPE

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others an order or action to be taken where a person has a pretension of authority |

4/23/82

NT

38. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow tightly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and interpersonal relationships that may inhibit |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings, and smells |
| <input checked="" type="checkbox"/> | g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action |

h. Interpret codes & symbols

NUMERATION/PLACE VALUE

NT

1. NUMERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through **N** in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, tens, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects in distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mill as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) denotation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- Rotate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimals)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

118. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

26. PROCEDURAL DIRECTIONS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Identify factual details or specifications that are found within a statement or written solution |
| <input checked="" type="checkbox"/> | b | Select parts of text and visual materials to complete a task activity |
| <input checked="" type="checkbox"/> | c | Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities |
| <input checked="" type="checkbox"/> | d | Determine the essential message of a paragraph or section of written material |
| <input checked="" type="checkbox"/> | e | Infer from a written source, which does not explicitly provide required information, in order to make a decision |
| <input checked="" type="checkbox"/> | f | Synthesize information from written sources which contributes to the completion of a task activity |

26. VOCABULARY

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Recognize common words and their meanings |
| <input checked="" type="checkbox"/> | b | Recognize task related words with technical meanings |
| <input checked="" type="checkbox"/> | c | Identify the correct meaning of a word from the context of a sentence |
| <input checked="" type="checkbox"/> | d | Recognize the meaning of common contractions, abbreviations and acronyms |
| <input checked="" type="checkbox"/> | e | Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s) |

INFORMATION ACCESS

27. REFERENCE SKILLS

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Locate a Technical Manual, Field Manual or any related source document by code number and title |
| <input checked="" type="checkbox"/> | b | Alphabetize words or topics to locate information |
| <input checked="" type="checkbox"/> | c | Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information |
| <input checked="" type="checkbox"/> | d | Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem |
| <input checked="" type="checkbox"/> | e | Determine, after scanning or skimming, whether the information is relevant |
| <input checked="" type="checkbox"/> | f | Cross-reference within and across source documents to select information needed to perform a routine |
| <input checked="" type="checkbox"/> | g | Organize information from multiple sources into a sequenced series of events |

28. TABLES/CHARTS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Obtain a fact or specification from a two-column table or chart to find information |
| <input checked="" type="checkbox"/> | b | Obtain a fact or specification from an intersection of a row by column table or chart |
| <input checked="" type="checkbox"/> | c | Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart |
| <input checked="" type="checkbox"/> | d | Apply information from tables and charts for locating malfunctions, or for selecting a course of action |

VISUAL AIDS

NT

29. ILLUSTRATIONS

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | a | Identify details, labels, numbers, and parts from an illustration or picture |
| <input checked="" type="checkbox"/> | b | Identify parts or details according to a key or legend |
| <input checked="" type="checkbox"/> | c | Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly |
| <input checked="" type="checkbox"/> | d | Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system |
| <input checked="" type="checkbox"/> | e | Follow illustrations, or photographs, arranged in a sequential order, as a guide |
| <input checked="" type="checkbox"/> | f | Integrate information from various sources to select a course of action |

30. FLOW CHARTS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Use a simple linear path of an organizational chart to list events in sequential order |
| <input checked="" type="checkbox"/> | b | Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving |
| <input checked="" type="checkbox"/> | c | Translate the significance of the symbols into physical activities |

31. SCHEMATICS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Isolate each major section or entity presented in a schematic diagram |
| <input checked="" type="checkbox"/> | b | Identify the components within each entity |
| <input checked="" type="checkbox"/> | c | Trace connections in an integrated circuit from their origin to another point within or from one entity to another |
| <input checked="" type="checkbox"/> | d | Isolate a problem component in a schematic and trace it to components believed to cause the problem |
| <input checked="" type="checkbox"/> | e | Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points |

WRITTEN COMMUNICATION

32. FORMS

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Locate the block on a form to enter the appropriate information |
| <input checked="" type="checkbox"/> | b | Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form |
| <input checked="" type="checkbox"/> | c | Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form |
| <input checked="" type="checkbox"/> | d | Write a descriptive account of an activity or transaction performed |
| <input checked="" type="checkbox"/> | e | Use a completed form to locate or compare information |

33. NOTE-TAKING

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | a | Distinguish between essential and non-essential details during the note-taking process |
| <input checked="" type="checkbox"/> | b | Record details without misinterpreting the intent of either written material or an interview |
| <input checked="" type="checkbox"/> | c | Rewrite all recorded details in sentence form |
| <input checked="" type="checkbox"/> | d | Organize all sentences into paragraphs |

NT

34. OUTLINING (topic or sentence)

- ☒ Distinguish between major and subordinate topics
- ☒ Generate titles for each major topic selected
- ☒ Use phrases or sentences to provide subordinate details under each major topic
- ☒ Alternates, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- ☒ State the intent or objective(s) of the report
- ☒ Describe the parameters of the event or situation
- ☒ Distinguish between relevant and irrelevant details
- ☒ Sequence events in the order they have occurred
- ☒ State general impressions of events described
- ☒ Select examples that will clarify major issues presented in the report
- ☒ Examine opposing points of view in the report
- ☒ Summarize the major points developed in the report
- ☒ Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- ☒ Spell frequently used words correctly
- ☒ Spell task-related words correctly
- ☒ Identify words that need to be capitalized
- ☒ Correct all misspelled words with or without the use of a reference source
- ☒ Apply all rules for and marks, commas, and apostrophes
- ☒ Apply common rules of grammar
- ☒ Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- ☒ Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- ☒ Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- ☒ Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- ☒ Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- ☒ Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- ☒ Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- ☒ Briefing - communicating final instructions to others or giving an account in summary
- ☒ Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- ☒ Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- ☒ Enunciate clearly, using the proper rate of speech
- ☒ Use technical vocabulary suitable to the task and level of the person
- ☒ Determine the appropriate amount of information to communicate
- ☒ Interpret figurative or idiomatic language by reference to its use in context
- ☒ Follow highly detailed, step-by-step directions
- ☒ Solicit feedback to confirm the accurate reception of the communication
- ☒ Recognize when a low-key, informal dialogue is suitable
- ☒ Recognize when direct verbal commands are necessary
- ☒ Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- ☒ Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- ☒ Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- ☒ Recognize personality factors and interpersonal relationships that may exist
- ☒ Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- ☒ Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- ☒ Apply preventive measures prior to task performance to minimize any potential safety or security problem
- ☒ Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- ☒ Identify similarities and differences between and among objects
- ☒ Use body language (motions, gestures, postures) to communicate or signal
- ☒ Determine the presence of a defect or extent of damage
- ☒ Match objects by size, shape, color and significant markings
- ☒ Classify objects by size, shape, color and significant markings
- ☒ Determine direction, duration, and intensity of sounds, sightings and smells
- ☒ Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMERATING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 10 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less than a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, twos, fives, etc backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degrees or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearing, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

6. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read-out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select hand(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle-size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

115. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems containing all processes using whole, mixed numbers and fractions
d. Solve problems, containing all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL ILLUSTRATIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for self triggered course of action

4/23/92

VISUAL AIDS

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources, to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE-TAKING

- Distinguish between essential and non essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- Distinguish between major and subordinate topics
- Generate titles for each major topic selected
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35. REPORT WRITING

- State the intent or objective(s) of the report
- Describe the parameters of the event or situation
- Distinguish between relevant and irrelevant details
- Sequence events in the order they have occurred
- State general impressions of events described
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- Examine opposing points of view in the report
- Summarize the major points developed in the report
- Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- Spell frequently used words correctly
- Spell task-related words correctly
- Identify words that need to be capitalized
- Correct all misspelled words with or without the use of a reference source
- Apply all rules for end marks, commas, and apostrophes
- Apply common rules of grammar
- Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- Briefing - communicating final instructions to others or giving an account in summary
- Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- Enunciate clearly, using the proper rate of speech
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- Solicit feedback to confirm the accurate reception of the communication
- Recognize when a low-key, informal dialogue is suitable
- Recognize when direct verbal commands are necessary
- Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- Recognize when the situation will require a structured, preplanned method of presentation

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- Recognize personality factors and interpersonal relationships that may exist
- Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- Apply preventive measures prior to task performance to minimize any potential safety or security problem
- Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- Identify similarities and differences between and among objects
- Use body language (motions, gestures, postures) to communicate or signal
- Determine the presence of a defect or extent of damage
- Match objects by size, shape, color and significant markings
- Classify objects by size, shape, color and significant markings
- Determine direction, duration, and intensity of sounds, sightings and smells
- Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Match numerals with word names and models |
| <input checked="" type="checkbox"/> | b. Write numerals one through <u>9</u> in sequential order from any starting point |
| <input checked="" type="checkbox"/> | c. State what numeral comes after, before, or between any two given numerals |
| <input checked="" type="checkbox"/> | d. Select the numeral which is greater/less than a set of numerals |
| <input checked="" type="checkbox"/> | e. Identify an object with a specified ordinal position |
| <input checked="" type="checkbox"/> | f. Write or state the place value of a particular digit, whole or decimal number |
| <input checked="" type="checkbox"/> | g. Round off a number to a specified place, whole or decimal |
| <input checked="" type="checkbox"/> | h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting) |
| <input checked="" type="checkbox"/> | i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values) |

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Name the markings on a linear scale |
| <input checked="" type="checkbox"/> | b. Differentiate units of measure and equivalents in the English and metric system |
| <input checked="" type="checkbox"/> | c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances |
| <input checked="" type="checkbox"/> | d. Identify measures of ounce, pound, gram |
| <input checked="" type="checkbox"/> | e. Identify measures of pints, quarts, gallons, liters |
| <input checked="" type="checkbox"/> | f. Use a scale which is not numerically calibrated |
| <input checked="" type="checkbox"/> | g. Estimate measures of varying lengths, dimensions or weights |

3. DEGREE MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify degree or mil as a unit in determining direction, distance or temperature |
| <input checked="" type="checkbox"/> | b. Estimate the measure of a given angle not greater than 180° |
| <input checked="" type="checkbox"/> | c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils |

4. TIME-TELLING MEASURES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use a 24-hour or digital clock to tell time |
| <input checked="" type="checkbox"/> | b. Name intervals and tell time in hours, minutes, and seconds |
| <input checked="" type="checkbox"/> | c. Estimate time in seconds, minutes, and parts of an hour |
| <input checked="" type="checkbox"/> | d. Identify calendar units and arrange them in Julian style |
| <input checked="" type="checkbox"/> | e. Convert time into hours and tenths of hours |
| <input checked="" type="checkbox"/> | f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances |

NT

5. GAUGE MEASURES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify the unit of measurement found on an instrument |
| <input checked="" type="checkbox"/> | b. Interpret the number, word, symbol from a display read-out |
| <input checked="" type="checkbox"/> | c. Recognize a "reading" from a gauge with color divisions |
| <input checked="" type="checkbox"/> | d. Recognize positive (+) and negative (-) deviation on a scale |
| <input checked="" type="checkbox"/> | e. Select band(s) from a multi scale gauge |
| <input checked="" type="checkbox"/> | f. Match a gauge reading to a specification using numbered or labeled intervals |
| <input checked="" type="checkbox"/> | g. Interpret gauge readings from an unnumbered/unmarked interval |
| <input checked="" type="checkbox"/> | h. Interpret a gauge reading which is fluctuating or momentarily sustained |
| <input checked="" type="checkbox"/> | i. Match specifications of required measures by manipulation, alignment or maintenance |

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify directions that tools, hardware, or components may be moved |
| <input checked="" type="checkbox"/> | b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle |
| <input checked="" type="checkbox"/> | c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs |
| <input checked="" type="checkbox"/> | d. Relate geometric symbols and graphic representations to actual systems, subsystems and components |

GEOMETRY

7. LINES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name points, lines, rays, and segments |
| <input checked="" type="checkbox"/> | b. Identify intersecting lines, parallel lines, and line segments |
| <input checked="" type="checkbox"/> | c. Define and identify perpendicular lines |
| <input checked="" type="checkbox"/> | d. Identify congruent segments |

8. PLANES

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify and name plane geometric figures |
| <input checked="" type="checkbox"/> | b. List the characteristics of geometric figures |
| <input checked="" type="checkbox"/> | c. Classify figures according to the number or measure of its sides or angles |
| <input checked="" type="checkbox"/> | d. Identify figures which possess similarities |
| <input checked="" type="checkbox"/> | e. Identify figures which may be parallel, perpendicular or congruent |

9. ANGLES AND TRIANGLES

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify and name the different kinds of angles and triangles, with their corresponding figures |
| <input checked="" type="checkbox"/> | b. Identify vertical, adjacent, complementary or supplementary angles |
| <input checked="" type="checkbox"/> | c. Classify triangles according to their sides or angle size |
| <input checked="" type="checkbox"/> | d. Identify altitudes and medians of triangles or the bisector of an angle |
| <input checked="" type="checkbox"/> | e. Name an angle by using letters, a number, or a single letter |

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

VISUAL AIDS

NT

76. PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

76. VOCABULARY

- Recognize common words and their meanings
- Recognize task-related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics in locate information
- Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim-reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two-column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for selecting a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly
- Interpret a three-dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or subsystem
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, designation of the part or equipment, and non-necessity, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE-TAKING

- Distinguish between essential and non-essential details during the note-taking process
- Record details without misinterpreting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate indent numbers and letters to establish a hierarchy |

35. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36. EDITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by starting the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | 37. TYPE |
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others an order or action to be taken where a person has a position of authority |

4/23/82

NT

38. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the position |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed, step-by-step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low-key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39. BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter-personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40. PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action |
| <input checked="" type="checkbox"/> | h. Interpret Code, & Symbols |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 9 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pint, quart, gallon, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 8400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify calendar units and arrange them in Julian style
- Convert time into hours and lengths of hours
- Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

b. GAUGE MEASURES

- Identify the unit of measurement found on an instrument
- Interpret the number, word, symbol from a display read out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

5. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles, with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- ☒ a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- ☒ a. Identify technical words associated with geometric figures
☒ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- ☒ a. Add or subtract whole numbers, without carrying or borrowing
☒ b. Add or subtract whole numbers, carrying and borrowing
☒ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimal)
☒ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
☒ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
☒ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
☒ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
☒ h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- ☒ a. Multiply and divide whole numbers
☒ b. Multiply and divide mixed numbers (whole and decimal)
☒ c. Divide a number with decimals in both divisor and dividend
☒ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
☒ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ☒ a. Subdivide whole objects or a set of objects into halves ($1/2$), thirds ($1/3$), fourths ($1/4$), eighths ($1/8$)
☒ b. Reduce fractions to lowest terms
☒ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
☒ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
☒ e. Add and subtract fractions, with same or different denominators
☒ f. Multiply and divide fractions with and without whole numbers
☒ g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- ☒ a. Draw geometric figures, plane and solid
☒ b. Match geometric figures with word names, equivalent measures
☒ c. Label all parts of geometric figures using mathematical and characteristic designators
☒ d. Use a protractor to measure angles, make geometrical constructions
☒ e. Construct perpendicular on a line segment, bisector of an angle
☒ f. Compute the perimeter and area of any figure
☒ g. Compute the circumference and area of a circle
☒ h. Compute the area and volume of any solid figure
☒ i. Use formulas in solving problems involving geometric figures
☒ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- ☒ a. Identify median and mode
☒ b. Compute averages
☒ c. Solve problems combining all processes using whole, mixed numbers and fractions
☒ d. Solve problems, combining all processes, involving units of measurement
☒ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
☒ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature ($^{\circ}$ or $^{\circ}$ C) measures
☒ g. Solve problems involving ratio and proportion
☒ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ☒ a. Identify coordinates of a point in any grid system
☒ b. Identify points on a line graph
☒ c. Match a graph with its equation

18. ALGEBRA

- ☒ a. Solve simple algebraic equations with one unknown
☒ b. Recognize and derive equivalent algebraic expressions
☒ c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- ☒ a. Use tables of trigonometric functions
☒ b. Use tables of logarithms to solve problems
☒ c. Solve geometric problems using trigonometric functions
☒ d. Use trigonometric ratios to solve problems

CONTENT HEADING

VISUAL AIDS

NT

25. PROCEEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written selection
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- Recognize common words and their meanings
- Recognize task related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Appropriate words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim-reading, whether the information is relevant
- Cross reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequential series of events

28. TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an intersection of a row by column table or chart
- Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating malfunctions, or for writing a course of action

NT

29. ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- Follow illustrations, or photographs, arranged in a sequential order, as a guide
- Integrate information from various sources to select a course of action

30. FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- Translate the significance of the symbols into physical activities

31. SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compare information

33. NOTE TAKING

- Distinguish between essential and non-essential details during the note taking process
- Record details without misinterpreting the intent of either written material or an interview
- Reverse all recorded details in sentence form
- Organize all sentences into paragraphs

NT

134 OUTLINING (topic or sentence)

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

135. REPORT WRITING

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

136 EDITING

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for and marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

137 TYPE

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instructor - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instructions to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to re-orient, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicate to others in an order or action to be taken where a person has a position of authority |

4/23/82

NT

138. CHARACTERISTICS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech. |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed, step by step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low-key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

139 BARRIERS

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

140 PRECAUTIONS

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

141. RECOGNITION

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, postures) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color, and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sight, sound, touch, smell, or tastes to determine a course of action |

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- Match numerals with word names and models
- Write numerals one through 10 in sequential order from any starting point
- State what numeral comes after, before, or between any two given numerals
- Select the numeral which is greater/less from a set of numerals
- Identify an object with a specified ordinal position
- Write or state the place value of a particular digit, whole or decimal number
- Round off a number to a specified place, whole or decimal
- Count by ones, tens, fives, etc. backward or forward (skip counting)
- Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- Name the markings on a linear scale
- Differentiate units of measure and equivalents in the English and metric system
- Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- Identify measures of ounce, pound, gram
- Identify measures of pints, quarts, gallons, liters
- Use a scale which is not numerically calibrated
- Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- Identify degree or mil as a unit in determining direction, distance or temperature
- Estimate the measure of a given angle not greater than 180°
- Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360° to 6400 mils

4. TIME TELLING MEASURES

- Use a 24 hour or digital clock to tell time
- Name intervals and tell time in hours, minutes, and seconds
- Estimate time in seconds, minutes, and parts of an hour
- Identify similar units and arrange them in Julian style
- Convert time into hours and tenths of hours
- Compare systems using Greenwich Mean Time (GMT) as a basis for establishing common standard times

NT

5. GAUGE MEASURES

- Identify the unit of measurements found on an instrument
- Interpret the number, word, symbol from a display read-out
- Recognize a "reading" from a gauge with color divisions
- Recognize positive (+) and negative (-) demarcation on a scale
- Select band(s) from a multi-scale gauge
- Match a gauge reading to a specification using numbered or labeled intervals
- Interpret gauge readings from an unnumbered/unmarked interval
- Interpret a gauge reading which is fluctuating or momentarily sustained
- Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- Identify directions that tools, hardware, or components may be moved
- Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- Identify and name points, lines, rays, and segments
- Identify intersecting lines, parallel lines, and line segments
- Define and identify perpendicular lines
- Identify congruent segments

8. PLANES

- Identify and name plane geometric figures
- List the characteristics of geometric figures
- Classify figures according to the number or measure of its sides or angles
- Identify figures which possess similarities
- Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- Identify and name the different kinds of angles and triangles with their corresponding figures
- Identify vertical, adjacent, complementary or supplementary angles
- Classify triangles according to their sides or angle size
- Identify altitudes and medians of triangles or the bisector of an angle
- Name an angle by using letters, a number, or a single letter

NT

110. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

111. TERMINOLOGY

- a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

112. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

113. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

114. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product, or quotient

4/23/82

NT

115. GEOMETRY

- a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designations
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

116. COMBINATION OF PROCESSES

- a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

117. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

118. ALGEBRA

- a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

119. TRIGONOMETRY

- a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

NT

34 OUTLINING (topic or sentence)

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Distinguish between major and subordinate topics |
| <input checked="" type="checkbox"/> | b. Generate titles for each major topic selected |
| <input checked="" type="checkbox"/> | c. Use phrases or sentences to provide subordinate details under each major topic |
| <input checked="" type="checkbox"/> | d. Alternate, indent numbers and letters to establish a hierarchy |

35 REPORT WRITING

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. State the intent or objective(s) of the report |
| <input checked="" type="checkbox"/> | b. Describe the parameters of the event or situation |
| <input checked="" type="checkbox"/> | c. Distinguish between relevant and irrelevant details |
| <input checked="" type="checkbox"/> | d. Sequence events in the order they have occurred |
| <input checked="" type="checkbox"/> | e. State general impressions of events described |
| <input checked="" type="checkbox"/> | f. Select examples that will clarify major issues presented in the report |
| <input checked="" type="checkbox"/> | g. Examine opposing points of view in the report |
| <input checked="" type="checkbox"/> | h. Summarize the major points developed in the report |
| <input checked="" type="checkbox"/> | i. Justify an action taken and give reasons for rejecting alternatives |

36 EDITING

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Spell frequently used words correctly |
| <input checked="" type="checkbox"/> | b. Spell task-related words correctly |
| <input checked="" type="checkbox"/> | c. Identify words that need to be capitalized |
| <input checked="" type="checkbox"/> | d. Correct all misspelled words with or without the use of a reference source |
| <input checked="" type="checkbox"/> | e. Apply all rules for end marks, commas, and apostrophes |
| <input checked="" type="checkbox"/> | f. Apply common rules of grammar |
| <input checked="" type="checkbox"/> | g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence |
| <input checked="" type="checkbox"/> | h. Appraise an entire written communication and make adjustments to improve clarity |

VERBAL COMMUNICATION

37 TYPE

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed |
| <input checked="" type="checkbox"/> | b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide |
| <input checked="" type="checkbox"/> | c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task |
| <input checked="" type="checkbox"/> | d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done |
| <input checked="" type="checkbox"/> | e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task |
| <input checked="" type="checkbox"/> | f. Briefing - communicating final instruction to others or giving an account in summary |
| <input checked="" type="checkbox"/> | g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision |
| <input checked="" type="checkbox"/> | h. Command - communicating to others an order or action to be taken where a person has a position of authority |

4/23/87

NT

38 CHARACTERISTICS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Enunciate clearly, using the proper rate of speech |
| <input checked="" type="checkbox"/> | b. Use technical vocabulary suitable to the task and level of the person |
| <input checked="" type="checkbox"/> | c. Determine the appropriate amount of information to communicate |
| <input checked="" type="checkbox"/> | d. Interpret figurative or idiomatic language by reference to its use in context |
| <input checked="" type="checkbox"/> | e. Follow highly detailed step by step directions |
| <input checked="" type="checkbox"/> | f. Solicit feedback to confirm the accurate reception of the communication |
| <input checked="" type="checkbox"/> | g. Recognize when a low key, informal dialogue is suitable |
| <input checked="" type="checkbox"/> | h. Recognize when direct verbal commands are necessary |
| <input checked="" type="checkbox"/> | i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort |
| <input checked="" type="checkbox"/> | j. Recognize when the situation will require a structured, preplanned method of presentation |

39 BARRIERS

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences |
| <input checked="" type="checkbox"/> | b. Recognize personality factors and inter personal relationships that may exist |
| <input checked="" type="checkbox"/> | c. Recognize feedback as a means of communicating more effectively and increasing task competence |

SAFETY/SECURITY

40 PRECAUTIONS

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment |
| <input checked="" type="checkbox"/> | b. Apply preventive measures prior to task performance to minimize any potential safety or security problem |
| <input checked="" type="checkbox"/> | c. Select an appropriate course of action in the event of an emergency |

PERCEPTUAL

41. RECOGNITION

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | a. Identify similarities and differences between and among objects |
| <input checked="" type="checkbox"/> | b. Use body language (motions, gestures, posture) to communicate or signal |
| <input checked="" type="checkbox"/> | c. Determine the presence of a defect or extent of damage |
| <input checked="" type="checkbox"/> | d. Match objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | e. Classify objects by size, shape, color and significant markings |
| <input checked="" type="checkbox"/> | f. Determine direction, duration, and intensity of sounds, sightings and smells |
| <input checked="" type="checkbox"/> | g. Infer from sight, sound, touch, smell, or taste to determine a course of action |
| <input checked="" type="checkbox"/> | h. Interpret codes & symbols |

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- Identify factual details or specifications that are found within a statement or written direction
- Select parts of text and visual materials to complete a task activity
- Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
- Determine the essential message of a paragraph or section of written material
- Infer from a written source, which does not explicitly provide required information, in order to make a decision
- Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- Recognize common words and their meanings
- Recognize task-related words with technical meanings
- Identify the correct meaning of a word from the context of a sentence
- Recognize the meaning of common contractions, abbreviations and acronyms
- Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- Locate a Technical Manual, Field Manual or any related source document by code number and title
- Alphabetize words or topics to locate information
- Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- Determine, after scanning or skim reading, whether the information is relevant
- Cross-reference within and across source documents to select information needed to perform a routine
- Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- Obtain a fact or specification from a two column table or chart to find information
- Obtain a fact or specification from an information of a row by column table or chart
- Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart
- Apply information from tables and charts for locating instructions or for selecting a course of action

4/23/87

VISUAL AIDS

NT

29 ILLUSTRATIONS

- Identify details, labels, numbers, and parts from an illustration or picture
- Identify parts or details according to a key or legend
- Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly
- Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or subsystem
- Follow illustrations, or photographs, arranged in a sequential order as a guide
- Integrate information from various sources to select a course of action

30 FLOW CHARTS

- Use a simple linear path of an organizational chart to list events in sequential order
- Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- Translate the significance of the symbols into physical activities

31 SCHEMATICS

- Isolate each major section or entity presented in a schematic diagram
- Identify the components within each entity
- Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- Isolate a problem component in a schematic and trace it to components believed to cause the problem
- Interpret symbols to indicate direction of flow, text points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- Locate the block on a form to enter the appropriate information
- Transfer a number, code, date, figure or related data from equipment or written source onto an appropriate section of the form
- Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- Write a descriptive account of an activity or transaction performed
- Use a completed form to locate or compile information

33 NOTE TAKING

- Distinguish between essential and non-essential details during the note-taking process
- Record details without interrupting the intent of either written material or an interview
- Rewrite all recorded details in sentence form
- Organize all sentences into paragraphs

END